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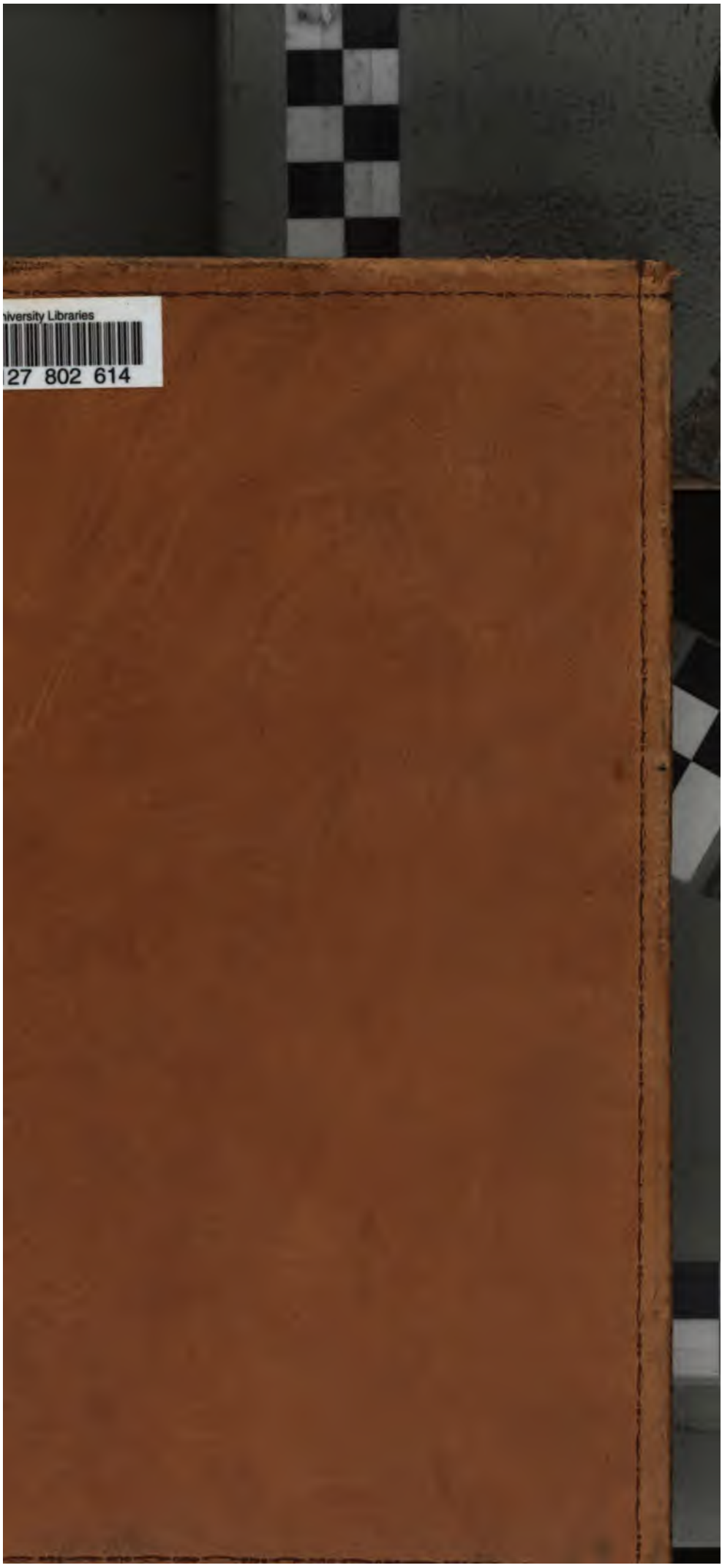
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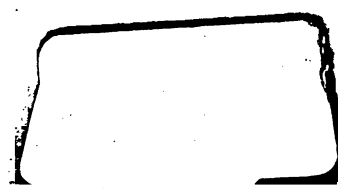

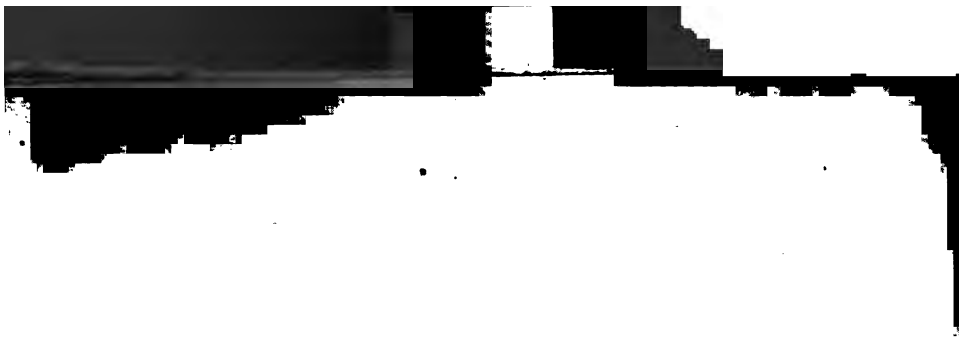

THE

EXECUTIVE DOCUMENTS

OF THE

SENATE OF THE UNITED STATES

FOR THE

FIRST SESSION OF THE FIFTY-FIRST CONGRESS.

1889-'90.

IN NINETEEN VOLUMES.

Volume 1.—Nos. 1 to 10, inclusive.
Volume 2.—Nos. 11 to 16, inclusive.
Volume 3.—No. 17, War Claims of Oregon.
Volume 4.—No. 18, International Exhibition at Melbourne.
Volume 5.—Nos. 19 to 52, inclusive.
Volume 6.—No. 53, part 1, International Marine Conference.
Volume 7.—No. 53, parts 2 and 3, International Marine Conference.
Volume 8.—Nos. 54 to 59, inclusive.
Volume 9.—Nos. 60 to 122, inclusive, except No. 115.
Volume 10.—No. 115, Rain-fall of Nebraska.
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Volume 13.—No. 231, Minutes of the International Congress.
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} Rept's of Int. Congress.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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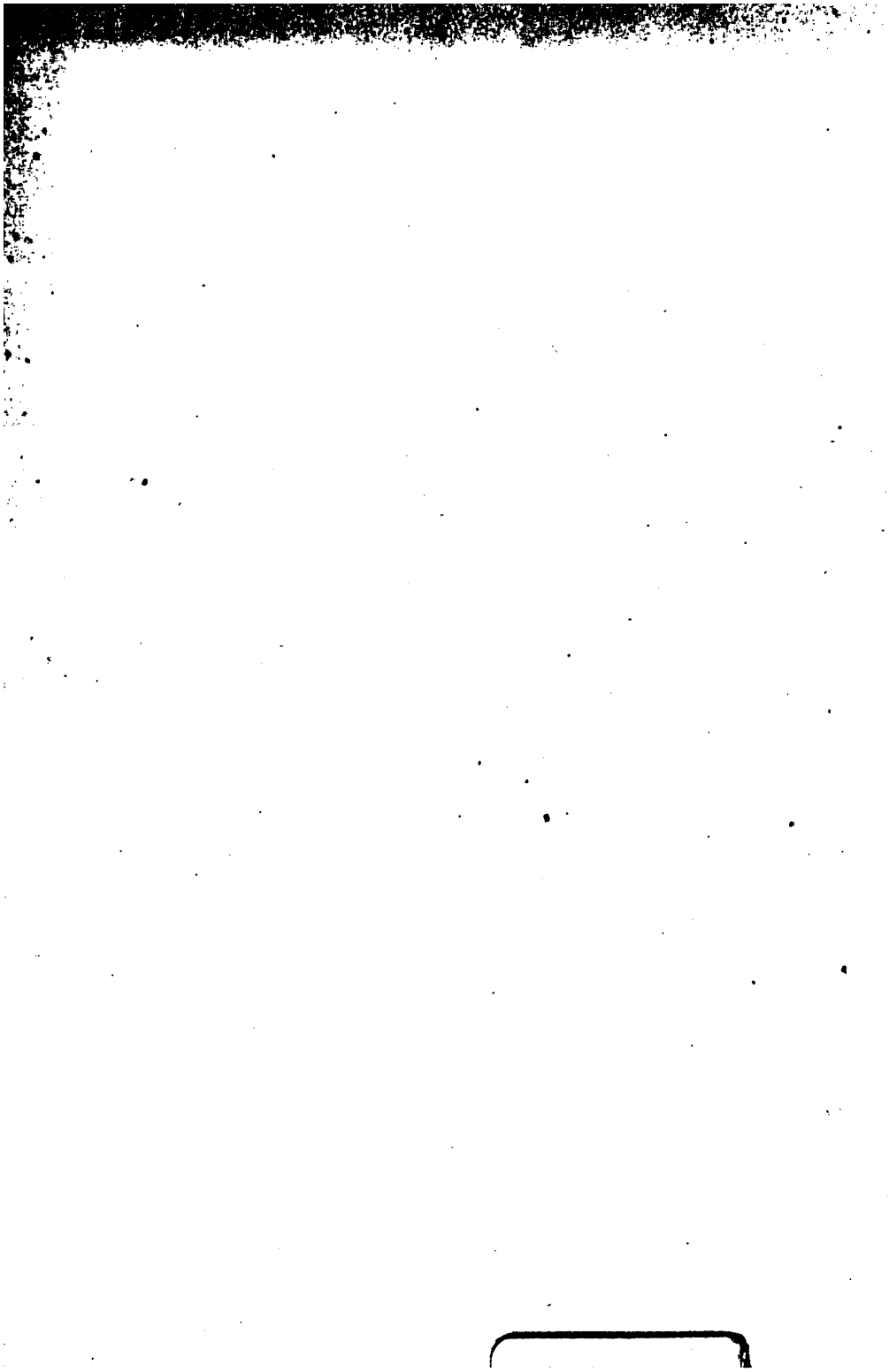

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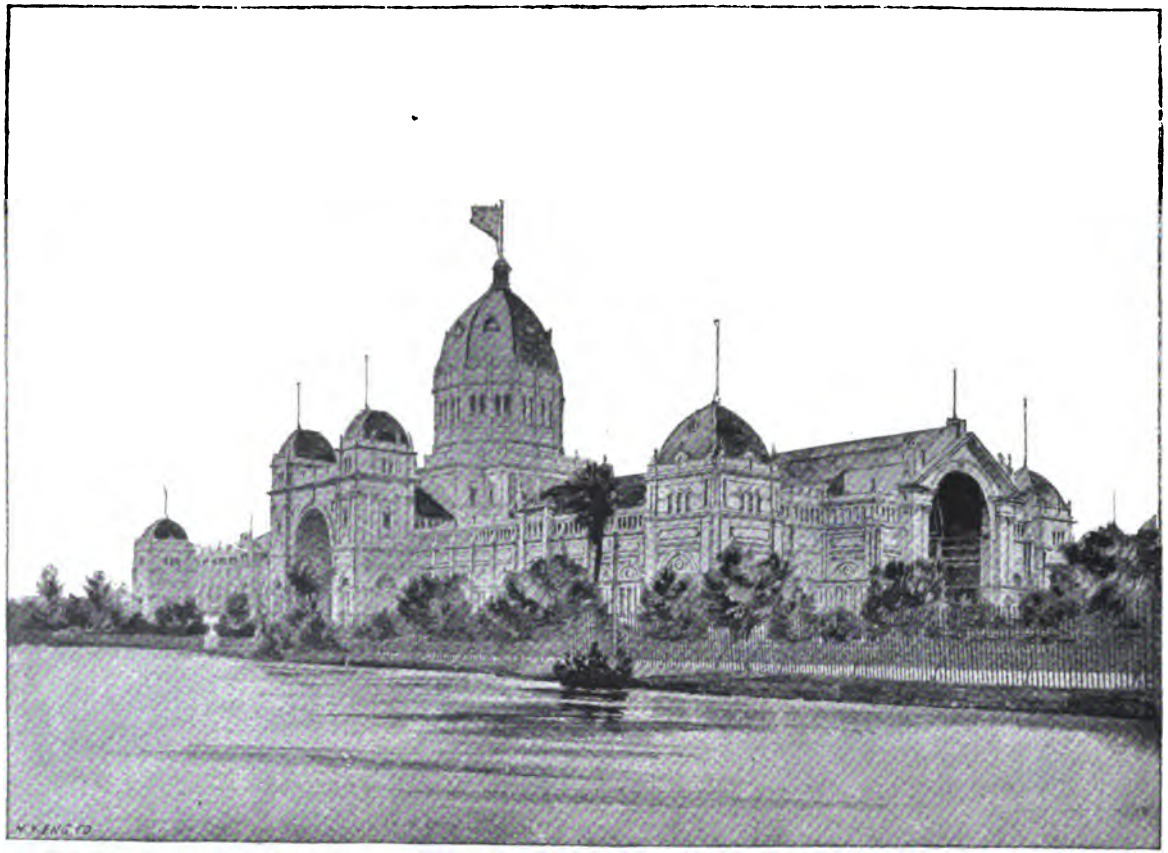

EXPOSITION BUILDING.

51ST CONGRESS, 1st Session. | SENATE. | Ex. Doc. No. 18.

REPORTS

OF THE

UNITED STATES COMMISSIONERS

TO THE

CENTENNIAL INTERNATIONAL EXHIBITION

AT

MELBOURNE

1888.

PUBLISHED UNDER DIRECTION OF THE SECRETARY OF STATE
BY AUTHORITY OF CONGRESS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

JANUARY 6, 1890.—Referred to the Committee on Foreign Relations and ordered to be printed.

LETTER OF TRANSMITTAL.

DEPARTMENT OF STATE,
Washington, December 21, 1889.

To the SENATE and HOUSE OF REPRESENTATIVES:

On the 12th of June, 1887, the British Government, through its representative at Washington, Sir Lionel West, extended an invitation to the United States to be represented at the Centennial International Exhibition to be held at Melbourne in 1888, in celebration of the centenary of the settlement of New South Wales.

Congress by the joint resolution, approved February 1, 1888, made provision for the United States to be represented, which enabled the President to accept the invitation so courteously extended. The resolution appropriated the sum of $50,000, to be expended in the discretion of the Secretary of State.

Under the authority conferred by the resolution, Hon. Frank McCoppin, of California, was appointed Commissioner. Four Assistant Commissioners and two Honorary Assistant Commissioners were also appointed. The Consul-General of the United States at Melbourne was considered as being *ex officio* a member of the Commission.

In accordance with the provisions of the joint resolution, I now transmit to Congress the report of Commissioner McCoppin, together with its accompanying papers. A detailed statement of Lieut. A. Marix, of the Navy, who acted in the capacity of Secretary and Disbursing Officer of the Commission, showing the expenditures which have been incurred in carrying out the intention of the resolution, is also inclosed.

Respectfully submitted.

JAMES G. BLAINE.

UNITED STATES COMMISSION.

Commissioner.

FRANK MCCOPPIN.

Assistant Commissioners.

FRANK B. WHEELER,
RICHARD L. MILLER,
ALEXANDER CAMPBELL,
THOMAS B. MERRY.

Honorary Assistant Commissioners.

JOHN K. SMYTH, Vice-Consul-General of the United States at Melbourne;
SAMUEL P. LORD, Esq.

Commissioner ex officio.

JAMES M. MORGAN, Consul-General of the United States at Melbourne.

Entomologists.

F. M. WEBSTER, Special Agent United States Department of Agriculture;
ALBERT KOEBELE, Special Agent United States Department of Agriculture.

Secretary, Disbursing Officer, and Superintendent of the United States Court.

Lieut A. MARIX, U. S. Navy.

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CHAPTER I.

REPORT OF THE COMMISSIONER, WITH ACCOMPANYING PAPERS.

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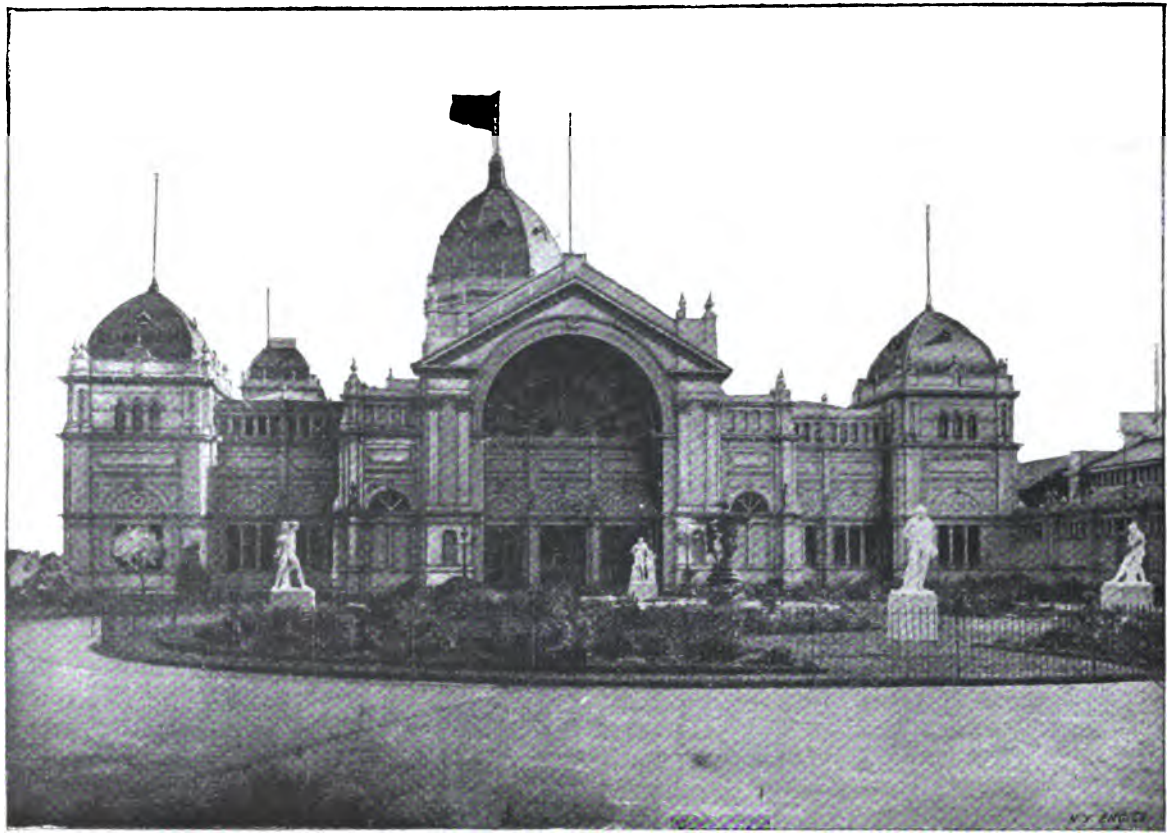


EXPOSITION BUILDING (MAIN ENTRANCE).

REPORT OF THE COMMISSIONER.

WASHINGTON, D. C., *July* 12, 1889.

SIR: The joint resolution adopted by Congress and approved by the President on February 1, 1888, appropriated $50,000 "to be expended in the discretion of the Secretary of State for the purpose of representation at the Melbourne Exhibition," and on the 30th of March following I, being then in California, received a dispatch from the Secretary of State saying, "The President wishes to know whether, if you are appointed Chief Commissioner to the Melbourne International Exhibition, you will serve?" and, having answered in the affirmative, was called to Washington, where I received the following instructions, viz:

Public resolution relating to the invitation of the British Government to the Government of the United States to participate in the International Exhibition at Melbourne to celebrate the founding of New South Wales.

Whereas the British Government has extended to the Government of the United States an invitation to participate in the International Exhibition which is to be held at Melbourne, beginning on the first day of August, eighteen hundred and eighty-eight, to celebrate the centenary of the founding of New South Wales: Therefore,

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That said invitation is accepted, and that there be, and there hereby is, appropriated, out of any money in the Treasury of the United States not otherwise appropriated, the sum of fifty thousand dollars, or so much thereof as may be necessary to effect the purpose of this resolution, to be expended in the discretion of the Secretary of State, for the purpose of such representation at said Exhibition.

SEC. 2. That it shall be the duty of the Secretary of State to transmit to Congress a detailed statement of the expenditures which may have been incurred under the provisions of this resolution, together with any reports which may be made by the representatives of this country at said Exhibition.

Approved, February 1, 1888.

Official Instructions.

DEPARTMENT OF STATE,
Washington, April 23, 1888.

SIR: By a joint resolution of Congress, approved February 1, 1888, the invitation of the British Government to participate in the International Exhibition to be held at Melbourne, beginning on the 1st day of August, 1888, to celebrate the centenary of the founding of New South Wales, was accepted by the United States, and an appropriation of $50,000, or so much thereof as might be necessary, was made, to be expended in the discretion of the Secretary of State, for the purpose of such representation at said Exhibition.

On the 12th instant, by direction of the President, you were appointed Commissioner of the United States to that Exhibition, and your certificate of appointment as such, with a special passport, has already been delivered to you. The joint resolution of Congress is silent as to the formation of the Commission; but, in view of the extended and growing commerce of the United States with the Australian colonies, and the importance of obtaining some representation from as many differents parts of this country as possible, it has been thought desirable that there should be associated with you a certain number of Assistant Commissioners. The limited amount of the appropriation made by Congress forbids any large expenditure of money in payment of official salaries, and it has been thought that five Commissioners, receiving compensation or an allowance for expenses, would be a number sufficient to discharge the duty intrusted to them, and that their compensation would not be disproportionate to the fund in question. In addition to these Commissioners, the Consul-General at Melbourne will be instructed to unite with you in giving every aid and encouragement to American exhibitors, and may be regarded as being, *ex officio*, a member of the Commission. Besides, it is proposed to appoint Honorary Assistant Commissioners, selected from residents at Melbourne, who, being upon the spot, will have no unusual expenses to meet, and who will doubtless be willing and able to render valuable assistance.

The Exhibition, as you are aware, is intended to be opened on August 1, 1888, and to remain open until January 31, 1889. It is expected that you will proceed to Australia in time, at least, to be present at the opening ceremonies, and it is preferable that you should be there for some little time in advance, in order to supervise the installation of American exhibits; and you should remain in Melbourne until the closing of the Exhibition, to see to the packing and removal of the goods belonging to American Exhibitors.

It is proposed to fix your compensation at the sum of $5,000, with an additional allowance of $1,500 in lieu of traveling and other personal expenses, making in all the sum of $6,500. Of this sum, $2,000 will be paid you at once, and the remainder you may receive in monthly sums, not to exceed $400 per month, until the close of the Exhibition and your return home, whereupon, on settlement of your accounts, any balance found due you will then be paid.

The Assistant Commissioners will all be strictly subject to your direction and will perform such duties as you may from time to time require of them. For those residing in the United States it is proposed to make an allowance, to cover all traveling, hotel, and other personal expenses, of $2,500 each. Of this sum, $1,500 will be paid each Assistant Commissioner before his departure, and the remainder upon the close of the Exhibition, the completion of his duties, and his return home.

Of the Assistant Commissioners there have been already appointed three, viz, Mr. Frank B. Wheeler, of New York, Mr. Richard L. Miller, of Lynchburgh, Va., and Mr. Alexander Campbell, of Fairfax, Concordia Parish, La. A fourth will be appointed as soon as a suitable person is found.

There have been designated as Honorary Assistant Commissioners Mr. John K. Smyth, now United States vice-consul-general at Melbourne, and Mr. Samuel P. Lord, formerly United States vice-consul-general at Melbourne.

The funds appropriated for the purposes of the representation of the United States at Melbourne have thus been in part disposed of by the arrangements for compensating the Commissioners. The Department also thinks it proper to reserve a sum to meet contingencies, and $3,500 will be held for this purpose.

The appropriation made by Congress was		$50,000
Allowance for compensation	$6,500	
Allowance for expenses of four Commissioners, at $2,500 each	10,000	
Amount reserved by Department for contingencies	3,500	
		20,000
Amount remaining to be disposed of		30,000

This sum of $30,000, as already stated, is not to be used for the payment of any compensation to the Commissioners, or for any of their personal, hotel, or traveling expenses. A portion of it may, however, be properly applied to the compensation of a suitable Secretary, at such a rate as you may think just and proper, and if, in your judgment, it shall be found necessary to secure other clerical aid to carry out the purpose of the resolution in question, you are authorized to employ such competent assistants as may be needed.

The object of the joint resolution above referred to was to authorize a participation in the Exhibition at Melbourne by the citizens of the United States as exhibitors and competitors for the prizes and the ulterior advantages of an extended market, as well as to obtain trustworthy information as to the progress of the industrial arts as shown by the exhibits, and especially an intelligent survey of the commercial needs of the country in which the Exhibition is held and the direction in which the industrial productions of the United States may obtain access thereto. You will, with the assistance of your associates, take all possible steps for making known the details and plans of the Exhibition, and for advising intending exhibitors as to the opportunities of forwarding their goods. You will also receive and place the exhibits at Melbourne, supervise the compilation of the catalogues, wherein the character and merits of the exhibits should be properly set forth, secure for the exhibitors a fair opportunity for competition for the prizes which it is understood will be awarded, and enforce such rules, with the assent of the local authorities and general Commission of the Exhibition, as shall insure good order in the American department. When the Exhibition is ended your assistance should be rendered to the American exhibitors for the removal or redelivery of their exhibits. A general report of the Exhibition should also be made by you, accompanied by reports from each of your assistants, upon the matters coming specially within their own observation, and by special reports from others as to all matters of interest, of new inventions, of valuable productions, and of means whereby commercial exchanges between the United States and the Australian colonies may be extended. All such reports by competent persons will be proper for submission, and they should be compiled in a form to be sent to Congress with a view to their publication.

The incidental expenses of your service, including cartage, and porterage upon exhibits at Melbourne, salary of a Secretary, clerical aid, rent of office, stationery, catalogues, printing, postage, telegrams, etc., the expense of the installation and removal of exhibits from the Exhibition building, as well as of their proper arrangement and display, will be borne by you so far as may be reasonable and necessary, having reference to the limited amount of the appropriation. A full account with vouchers must be submitted by you in accordance with the instructions you will receive from the accounting officer of this Department. With regard to the payment of freight from the United States to Australia upon goods, the matter is left entirely to your discretion. It is understood that a large number of goods will, at any rate, be shipped from the United States for exhibition, without requiring any pecuniary aid from the Government. In some cases, however, it may be found that persons who would otherwise become exhibitors may be deterred from doing so by the cost of sending their goods to Melbourne. In such cases, of goods intended bona fide for exhibition, it may be desirable for you to pay the cost of transportation, but it is obvious that except in a limited number of such cases the funds at your disposal will be insufficient to enable you to do so.

A comparison of the expenses of the Exhibition at Melbourne in 1880 may assist you in making an estimate to serve as a guide in the expenditure of the fund now at command, and indicate the due proportion of the freight and other items to be paid. In order to enable you to make payments promptly for the various objects for which you will have occasion to disburse money, it is proposed to place the sum of $5,000 subject to your control, for the purposes and objects indicated, and a letter of credit on Messrs. Brown, Shipley & Co., of London, will also be handed you. In

order, however, to comply with the requirements of law and to secure the Government against loss, it will be necessary that you or one of your assistants or subordinates should be designated to act as a disbursing officer of the United States, in whose hands the funds in this country may be placed; and this person will be required to give a bond to the United States in the sum of $10,000, a form for which is herewith communicated to you. In disbursing these amounts and such other sums within the amount of the appropriation named, as may be authorized by this Department, an itemized statement will be duly prepared under your direction and submitted to this Department for its approval before allowance.

It must be carefully borne in mind by all persons concerned in the representation of the United States at the Melbourne Exhibition, that in no event can the expenses incurred by the United States in this connection exceed the sum appropriated by Congress. And I especially notify you that no obligations are authorized which shall involve other or greater liabilities than those within the intent and meaning of your instructions, and all proper expenses are to be met by cash payments.

You will make monthly reports to the Department of all your expenses, and from time to time you will report any official acts in connection with the Exhibition which will serve to keep the Department advised of your operations. Your communications should be numbered consecutively for convenience of reference and for the files.

In conclusion I have pleasure in expressing my confidence that you will spare no effort to make the exhibit of the United States at the Melbourne Exhibition creditable and productive of useful results to both countries.

I am, sir, your obedient servant,

T. F. BAYARD.

FRANK MCCOPPIN, Esq.,
Commissioner of the United States to the Melbourne International Exhibition.

ORGANIZATION OF COMMISSION.

Lieut. Adolph Marix, U. S. Navy, was, on the 25th day of April, 1888, by order of the Secretary of the Navy, detached from the office of the Judge-Advocate-General of the Navy and ordered to report to the Commissioner to Melbourne for special duty. As Secretary and Disbursing Officer to the Commission and also as Superintendent of the American Department in the Exhibition, Mr. Marix has done his work with marked ability and good judgment.

It will thus be seen that it was nearly the end of April, 1888, before the Commission was finally organized, and as the Exhibition was to be opened August 1 following, I greatly feared that those who might desire to participate in the Exhibition would not be able to get their goods to Melbourne in time, and, therefore, that the United States would not make a creditable appearance in that distant place; but fortunately everything came out better than I had expected. The amount of space originally applied for on behalf of the United States was 100,000 square feet, but owing to the delay, first on the part of Congress in dealing with the question, and, secondly, in the organization of the Commission, the authorities in Melbourne had no information that would help them to an intelligent determination of this question until the last moment, when it was found that our exhibits would cover more space than the building, as it then stood, would afford. Seeing this, the Victorian Commission, in the most obliging manner and at considerable

expense to their treasury, had additional annexes erected for the accommodation of our people, and finally 89,401 square feet were occupied by exhibits from the United States. The total floor space covered by the Exhibition was something more than 34 acres.

OFFICES IN THE UNITED STATES.

For the purpose of furnishing information touching the exhibition to all persons desiring the same, Lieutenant Marix opened an office in Washington, where he remained until the 20th of May, when he proceeded to Melbourne, via San Francisco. During the same period and for a month longer I kept an office open in San Francisco, where and from which was furnished such information as it was thought would be useful to those persons who might desire to participate in the Exhibition.

ENTOMOLOGISTS.

At this time the honorable the Secretary of State forwarded to me a memorandum made by Prof. C. V. Riley, United States Entomologist, having reference to an insect called the "Cottony Cushion Scale," brought hither from Australia, and which is very destructive of fruit and other trees in southern California, and adding that, as there is another insect in Australia which destroys this one, he would like to go out there with an assistant, for the purpose of collecting and introducing into California the said insect. I wrote to the Department May 31, 1888, saying that my attention had already been called to this interesting subject by Mr. De Barth Shorb, of Los Angeles, and that I would most cheerfully pay out of the funds at my disposal the sum necessary for this purpose, provided the professor and his assistant would be willing to come as aids to the Commission, and report to the Commissioner, to the end that their work should form a feature of my final report to the Department. Professor Riley did not come out himself, but sent two of his assistants, Messrs. Webster and Koebele, who spent several months in Australia, and whose special reports I expect to be able to hand you herewith.

ISLANDS IN THE PACIFIC OCEAN.

In going hence to Australia, we touched at the Hawaiian and Samoan Islands. A residence of more than a year on the first-named group made me familiar with the appearance and habits of the people thereof; but the Samoans, or "Navigators," are far more interesting. As they came off, at least one hundred and fifty of them, to our ship in their boats, racing with great spirit and singing their native songs, they presented a spectacle never to be forgotten by those who witnessed it. The men are strikingly handsome, many of them of majestic stature and have large and lustrous eyes, the prevailing expression of which, however, is mild, almost pathetic; and the women, especially the youthful,

are beautiful. None of the latter came on board ship, and by the time the men had disposed of their articles of native handicraft to the passengers, their boats had drifted astern fully a mile, but those fine fellows took to the water as though it was their native element.

OPENING OF EXHIBITION.

At the opening of the Exhibition, August 1, 1888, by his excellency the governor of Victoria, it was estimated that fully 150,000 visitors were drawn into Melbourne to witnes the inaugural ceremonies. Governor Loch was assisted upon that occasion by the governors of all the other Australian colonies, and as these distinguished personages, accompanied by the ladies of their families, and the members of their respective staffs, entered the Grand Avenue of Nations, the United States Court being next the entrance, it was most gratifying to our feelings to hear our national anthem played by the numerous bands present.

Immediately after the formal opening, which was announced to the outside multitude who could not get into the Exhibition building by the firing of artillery, the governor of Victoria, accompanied by the visiting governors, passed in front of the spaces called "courts" occupied by the colonies and by foreign nations, and the representatives of those nations were then, each in his turn, formally presented. The American court, though not in as forward a state of preparation on the opening day as could be desired, was nevertheless fully up with the courts of other nations, except Germany's, which was in an almost finished state.

In my first dispatch from Melbourne to the Department I was able to say that, considering the shortness of the time for preparation between the organization of the Commission and the opening of the Exhibition, it was satisfactory to know that all the exhibitors from the United States were satisfied with the spaces allotted to them, as well as with the general arrangements made for their convenience and a proper display of their several wares; and that it might be confidently assumed, even at that early day, that the result of the Exhibition would be such as to fully justify Congress in having appropriated public funds for that purpose.

EXPENDITURES.

The financial statement of the Secretary and Disbursing Officer, submitted, will show the uses to which the funds intrusted to me have been put. Under my instructions from the honorable the Secretary of State the sum of $30,000 was placed at my disposal for the expenses of this Commission, other than the compensation of the Commissioners. These expenses, to date, amounted to $22,023.30; but as the sum of $1,183.26 was realized from the sale of Government property and premiums on drafts, the surplus, including the $3,500 reserved by the Department

This Certificate
is given in recognition of valuable
service rendered by

as a Juror
appointed on behalf of the
United States of America.

Frank McCoppin
Chief Commissioner.

Superintendent.

Melbourne. January 31st 1889.

for contingencies, amounts to $12,659.96; but this will be somewhat reduced by the expenses of preparing the report for Congress.

I may be permitted to remark that this is perhaps the only instance in the history of Exhibitions, at which our Government was represented, that a surplus has been turned into the Treasury.

JURORS.

In the second month of the Exhibition the representatives of the different colonies and countries having exhibits on hand were invited to furnish a list of jurors, one for each jury, that should pass upon a particular class of objects; and being desirous that all those representing American interests should, if possible, be satisfied, I invited them to meet me for conference, and after considerable discussion they substantially agreed among themselves upon the names of the persons they wished appointed. Many of these gentlemen thus selected rendered continuous and valuable service to those whose interests were intrusted to them, as the awards made by the juries upon which they served conclusively show.

Having no authority to compensate these gentlemen for their services, I had prepared and presented to each, at the close of the Exhibition, on behalf of the United States, a handsomely-bound certificate, under my official signature.

AWARDS.

American exhibitors, out of a total of 339 exhibits, received 222 awards, of which 114 were of the first order of merit, 58 of the second, 36 of the third, and 14 honorable mentions.

The medals and certificates, when ready, will be delivered to the United States Consul-General at Melbourne.

APPEALS AGAINST DECISIONS OF JURIES.

Rule 29 of Jury Regulations provides that—

All appeals against decision of juries shall be submitted to the chairman of juries, who shall have the power to call in or consult with independent experts, and on their advice may refer back to the jury, or otherwise, whose decision shall have been appealed against. The applicant must deposit with the chairman of juries the fee to be paid to the experts, which will be fixed by the Executive Commissioners. If the appeal is sustained the fee will be returned.

Subsequently this fee was fixed at 4 guineas, or $20.54; and whenever a protest was made by any American exhibitors, and was believed by the Commissioner to be based upon meritorious grounds, the protesting exhibitor was informed that this fee would be made good out of the funds at my disposal if it was not returned by the chairman of juries. But such encouragement was in no instance given in cases of competition between American exhibitors.

TRANSFER OF DECORATIONS TO PARIS.

In my dispatch to the Department of October 2, 1888, I stated that in the decoration of the United States court, in the Exhibition, there were fifty to sixty American flags of different sizes, and also a number of handsome shields and eagles, and suggested that possibly they could be utilized by the Commissioner to the Paris Exposition of 1889; and General Franklin, to whom the matter was referred, having cordially approved the suggestion, these decorative articles, which cost this Comsion $1,414.66, were carefully packed and shipped to Paris.

TRADE WITH AUSTRALIA.

I have already informed the Department that all the public men of Australia whom I had the honor to meet were most flattering in their expressions towards the United States, and the same may be said of all classes of people in that country. They appear to greatly admire American institutions, and would, I am persuaded, rather hold intimate commercial relations with the United States than with any other country in the world, outside of the parent country. There is, therefore, a very wide field in these great colonies in which to expand the commercial relations between the two countries, and from which large reciprocal benefits could be gathered. But this can not be done upon sentiment alone. Ships are required to carry the productions of nature and of man from one country to another, and ships carrying the American flag are a very rare sight in these distant seas.

When I left Sydney there was but one American ship in that beautiful harbor, surrounded as it is by a great city of 400,000 inhabitants; nor were there more than two or three in the equally important port of Melbourne; and coming home via Hong-Kong, Nagasaki, Kobe, and Yokohama—all important commercial centers—the flag of our country was a rare sight indeed, and one must go abroad into those distant lands and seas to fully realize what a gladsome sight that flag is. There must be something radically wrong in the laws of a country which deprives its citizens of the privilege and profit of carrying its own commerce upon the high seas.

ATTENDANCE AT THE EXHIBITION.

Though the attendance was unprecedentedly large, the Exhibition was a financial failure, involving a deficit of more than a million dollars. During the six months the Exhibition was open it was visited by something over 2,000,000 people; and when we consider that the colony of Victoria, which projected and paid for the Exhibition, contains but about 1,000,000 inhabitants, and the whole of Australasia, including New Zealand and Tasmania, but 3,500,000, it will be seen that the attendance was in proportion to population the largest on record.

The Exhibition held in London in 1851 was visited by 6,000,000, that

in Dublin in 1853, by 1,000,000, that at Paris in 1855, by 4,500,000, that at London in 1862, by 6,000,000, that at Philadelphia in 1876, by 10,000,000, and that at Melbourne in 1888–'89, by 2,168,192. But Victoria never expected to make money out of the Exhibition; on the contrary, it must have been evident, from the first conception of the idea, to the liberal-minded and far-seeing statesmen of that colony, that there would be a deficit which would have to be made good out of the public treasury. The scheme was a very ambitious one for a small community in a far-distant country to embark in, but Victoria will be the gainer by it in the end, if she is not so already. People were drawn thither from all parts of the world, and the wonderful natural resources of that colony, as indeed of the whole of Australasia, are better known abroad to-day, because of the Exhibition, than they would be in twenty years of ordinary colonial life.

GOOD WILL TOWARDS THE UNITED STATES.

There is in that country the framework of a great empire of English-speaking people. They are now divided up into separate colonies, each having widely divergent fiscal, railway, and other systems, which work greatly to the disadvantage of their own citizens; but they are absolutely certain to become in the course of time fused into one great homogeneous nation. But whatever form of government they may take on in the future, I am satisfied of one thing, and that is, of all the English-speaking people in the world, Australia is sure to become our nearest and best friend—the younger brother of Brother Jonathan. This sentiment flamed out in an almost passionate way at the closing of the Exhibition. The colonists had been watching with deep interest certain movements in the South Pacific, in which the United States were taking what they regarded as an honorable part, and when, at a particular moment during the closing ceremonies, the United States flag was unfurled upon the platform occupied by the governor of Victoria and other high dignitaries, it received such an ovation from the assembled multitude as the flag of no other nation ever before received in that country.

CORRESPONDENCE BEFORE DEPARTURE.

Before leaving for the United States I addressed the following letter to the President of the Exhibition:

UNITED STATES COURT, *January* 12, 1889.

DEAR SIR: Before leaving Melbourne for home, I desire to express to you, and through you, to your Associate Commissioners, my deep sense of gratitude for the uniform courtesy which has been extended to me personally, as well as for the generous treatment which all those representing America and American interests here have received at the hands of your Commission.

Where all have acted so handsomely towards us it may perhaps seem invidious to single out any for particular mention, nevertheless it is due to my own feelings to say that I am under special obligations to you, Mr. President, and to the Vice-President,

Colonel Sargood, and also to Messrs. Blyth and Byron Moore, of the Commission, as well as to the Secretary, Mr. Lavater, and the Superintendent, Mr. Pugh, and Major Bull for continuous good offices. These gentlemen I have found ever ready and willing to accommodate and assist me in the discharge of the duties which were devolved upon me here, thus making, what under other circumstances might have been a tedious and disagreeable task, a work of pleasure and enjoyment.

Wishing you and your associates all happiness,

I have the honor to be, sir, your obedient servant,

FRANK MCCOPPIN,
Commissioner.

Hon. Sir JAMES MACBAIN, K. B.,
President Centennial International Exhibition, Melbourne, 1888.

To this letter* I received the following reply:

EXHIBITION BUILDINGS,
Melbourne, January 15, 1889.

SIR: I have the honor to acknowledge the receipt of your very flattering communication of the 12th instant, in which you express in the most cordial terms your gratification at the courtesy and hospitality which have been extended to you, and to all representing American interests at our Centennial International Exhibition.

It gives me very great pleasure to feel assured that you, and the gentlemen associated with you as representatives of the great American Republic, so fully appreciate our endeavors to make your stay amongst us a pleasant one.

The successful manner in which you have carried out the high and important duties devolving upon you as the Executive Commissioner for the United States of America has done much to materially lighten the arduous labors and many anxieties of the Victorian Executive Commissioners and their officers; while your invariably courteous demeanor and ready business tact have won golden opinions from all with whom you have been brought in contact.

Permit me for myself and colleagues to thank you most heartily for your kind expressions of good will, and to wish you, and the other American representatives, a pleasant voyage and safe return to your homes.

With the assurance of my continued esteem and respect,

I have the honor to be, sir, your obedient servant,

J. MACBAIN,
President.

Hon. FRANK MCCOPPIN,
Executive Commissioner for the United States of America.

TRANSMITTING PAPERS AS PART OF REPORT.

I have the honor to transmit herewith the following papers as a part of my report, viz: Rules and Regulations governing the exhibition; General Classification of Exhibits; Official Catalogue of Exhibits from the United States; Organization of International Juries; List of United States Jurors; Awards to Exhibitors from the United States.

APPENDICES.

Also a list of the Victorian Executive Commissioners; their twelve official reports; the Accountant's statement of the attendance and receipts; address by the Mayor of Castlemaine to the United States Commissioners; the Commissioner's speech at Castlemaine; Sir James Mac-

* See Appendix F and G.

Bain's speech at Melbourne; the Commissioner's speech in reply thereto; and the Commissioner's letter to the honorable Secretary of the Navy.

REPORTS.

I hand you herewith the following special reports:

First. The report of the Secretary and Disbursing Officer.

Second. Special reports by Messrs. James Smith, Andrew Semple, A. B. Robinson, Julian Thomas, and George B. Nasey upon the Exhibition at large, Machinery, Colonial Finances, Labor and Labor Organizations, and Land Tenure. I have had the foregoing reports prepared under the authority granted me by the Department to have special reports written "as to matters of interest, of new inventions, of valuable productions, and of means whereby commercial exchanges between the United States and the Australian colonies may be extended."

Third. The reports of the four Assistant Commissioners, the two Entomologists, and Lieut. A. Marix.

I have the honor to be, sir,

Very respectfully, your obedient servant,

FRANK MCCOPPIN,
Commissioner.

Hon. JAMES G. BLAINE,
Secretary of State.

Rules and regulations made by the Commissioners of the Centennial International Exhibition, Melbourne, 1888, in pursuance of the provisions of section 4 of the act No. 619, and section 5 of the act No. 920, and approved by the Governor-in-Council on the 8th November, 1887. (Vide "Government Gazette" 8th November, 1887, pp. 3342 to 3347.)

Whereas it has been deemed advisable to hold an International Exhibition of works of industry and art at Melbourne in the year 1888, and whereas it is provided by the "Victorian Exhibitions Act 1878" that the Governor-in-Council may from time to time appoint or remove such persons as he may think fit to be Exhibition Commissioners, one of whom he shall appoint to be President, and that the Commissioners for any Exhibition shall be a body politic and corporate by the name of the Exhibition Commissioners, and that the said Commissioners, or a majority of them, at any general meeting assembled shall have power from time to time to make, repeal, alter, and re-enact such rules and regulations as they may think fit for the purpose of providing for—

I. The conduct of their own proceedings;

II. The due management of the affairs of the Exhibition in its several departments;

III. The temporary admission or exclusion of the public or any individual to and from the Exhibition or buildings or grounds or any part thereof and the behavior to be observed therein;

IV. The sum to be demanded and paid for admission to the Exhibition or buildings or grounds or any part thereof, and the manner in which all moneys received by the Commissioners shall be applied; and

V. The purposes of public instruction, enjoyment, or entertainment for which any buildings or grounds or any part thereof may be used and applied.

And whereas His Excellency Sir Henry Brougham Loch, Knight Commander of the Most Honourable Order of the Bath, Governor and Commander-in-Chief in and over the Colony of Victoria and its dependencies, etc., with the advice of the Executive Council of the said colony, did, under his hand and the seal of the colony, on the 6th day of January, 1887, appoint His Honour George Higinbotham, Chief-Justice of the Supreme Court of the Colony of Victoria, to be President; the Honourable Sir James MacBain, Knight, President of the Legislative Council; the Honourable Peter Lalor, M.P., Speaker of the Legislative Assembly; the Honourable Sir William John Clarke, Baronet, M.L.C.; and the Honourable Colonel Frederick Thomas Sargood, M.L.C., President of the Melbourne Chamber of Commerce, to be Vice-Presidents; the Honourable James Munroe, M.P.; the Honourable William Mountford Kinsey Vale; Joseph Bosisto, Esq., C.M.G., M.P.; Robert Murray Smith, Esq., C.M.G.; William Cain, Esq., J.P., the Right Worshipful the Mayor of the City of Melbourne; Thomas Houlden Thompson, Esq., J.P., Mayor of the City of Ballarat; Patrick Hayes, Esq.; J.P., Mayor of the City of Sandhurst; Lambton Le Breton Mount, Esq,, President of the Victorian Chamber of Manufactures; William Arthur Trenwith, Esq., President of the Melbourne Trades Hall Council; John Blyth, Esq., J.P.; and Henry Byron Moore, Esq., to be members of the Commission, the above-named President, Vice-Presidents, and Members to be also the Executive Commissioners for the said Exhibition. And did further, on the 8th day of February, 1887, appoint the following gentlemen to be additional members of the Commission: Sir Graham Berry, K.C.M.G.; the Right Honourable H. C. E. Childers, M.P; Sir Henry Barkly, G.C.M.G., K. C. B.; Major-General Sir Andrew Clarke, R.E., G.C.M.G., C. B.; Sir James M'Culloch, K.C.M.G.; Sir Samuel Wilson, Kt., M.P.; the Honourable James Service; the Honourable J. Dennistoun Wood; John Badcock, Esq.; John H. Blackwood, Esq.; John M. Patterson, Esq.; William Peterson, Esq.; Charles E. Bright, Esq.; C.M.G.; Robert Rome, Esq. And did further on the 17th day of May, 1887, appoint the following gentlemen to be further additional Members of the Commission: The Honourable Thomas Howard Spensley; John Inglis, Esq.; Alfred Taddy Thomson, Esq.; Archibald Cameron Corbett, Esq.; Members of the Legislative Council and Legislative Assembly *ex officio*; Consuls-General, Consuls, and Vice-Consuls *ex officio*; the Honourable Sir Bryan O'Loghlen, Bart.; the Honourable William Bayles; the Honourable Thomas Loader; the Honourable William Wilson; Sir Arthur Nicolson, Bart.; Sir F. Von Mueller, K.C.M.G.; Frederick McCoy, Esq., C.M.G., Sc.D. (Cantab.); Anthony Colling Brownless, Esq., M.D., Chancellor of the University of Melbourne; G. L. Allen, Esq.; Andrew Anderson, Esq., J.P.; James Baird, Esq.; W. Bastow, Esq., J. P.; Henry Bell, Esq., Benjamin Benjamin, Esq., J. P.; John Benn, Esq.; Cuthbert R. Blackett, Esq., J. P.; J. M. Bruce, Esq., J. P.; Thomas Brunton, Esq.; J. P.; John Buncle, Esq., J. P.; R. Caldwell, Esq.; Frederick Call, Esq., P. M.; Stanford Chapman, Esq.; Jenkin Collier, Esq.; T. J. Connelly, Esq.; George Craib, Esq., J. P.; James Craig, Esq.; John Danks, Esq., J. P.; J. M. Davies, Esq.; Paul de Castella, Esq.; Rev. E. C. De Garis; T. K. Dow, Esq.; W. Drummond, Esq.; David Elder, Esq.; R. L. J. Ellery, Esq.; Jas. Fergusson, Esq., J. P.; G. R. Fincham, Esq.; Archibald Fisken, Esq., J. P.; George Graham, Esq., J. P.; F. S. Grimwade, Esq.; A. Gunn, Esq.; J. F. Hamilton, Esq.; W. T. Hansford, Esq., J. P.; H. A. Harwood, Esq.; G. M. Hitchcock, Esq.; Clement Hodgkinson, Esq., C. E.; Charles H. James, Esq., J. P.; W. B. Jones, Esq., J. P.; Arthur S. King, Esq., J. P.; John A. Kitchen, Esq.; L. Kong Meng, Esq.; W. Lawrance, Esq., J. P.; J. Long, Esq.; Samuel P. Lord, Esq.; J. Malcolm, Esq., J. P.; Jas. Mirams, Esq., J. P.; Jno. Moodie, Esq.; Thompson Moore, Esq., J. P.; Geo. G. Morton, Esq.; Thos. Moubray, Esq.; J. P.; L. Munro, Esq.; C. McCracken, Esq.; Jno. McIlwraith, Esq., J. P.; Martin McKenna, Esq., J. P.; L. C. Mackinnon, Esq., Wm. McLean, Esq., J. P.; Jos. Nixon, Esq.; Thomas O'Grady, Esq., J. P.; Horace Perkins, Esq.; Charles Pleasance, Esq.; Andrew Plummer, Esq., M. D.; J. K. B. Plummer, Esq.; Robert Reid, Esq.; John Robb, Esq.; Andrew Rowan, Esq., J. P.; R. M. Serjeant, Esq., J. P.; W. B. Shaw,

Esq.; E. Steinfeld, Esq., J. P.; G. J. Sims, Esq.; James Smith, Esq.; Thomas Smith, Esq., J. P.; J. C. Stewart, Esq.; J. C. Syme, Esq.; W. K. Thomson, Esq., J. P.; James Thomson, Esq.; Charles A. Topp, Esq.; Henry G. Turner, Esq., J. P.; Oliver Vial, Esq.; Thomas D. Wanliss, Esq.; Andrew Webster, Esq., J. P.; John Whiting, Esq.; John B. Whitty, Esq.; J. Wilks, Esq., J. P.; Agar Wynne, Esq.; John Zevenboom, Esq., J. P.

Now, therefore, a majority of the Commissioners have, at a general meeting assembled on the twenty-first day of September, 1887, under the powers vested in them by the aforesaid act, made the following rules and regulations:

I.—Conduct of Proceedings.

1. The Commissioners shall meet once in every month, at a place and hour to be fixed in the notice of meeting, to consider the business submitted by the Executive Commissioners, and other business, of which due notice has been given. The Executive Commissioners shall meet at such times and places as may be deemed necessary.

2. Fifteen members shall form a quorum. If that number be not present within fifteen minutes after the time appointed for the meeting, the members present may adjourn to a particular day, and receive notices of motion for the next or any other day of meeting.

3. At all meetings, the president, or in his absence one of the vice-presidents, shall take the chair, and may vote; and, in case of equality of votes, shall have a casting vote. In the absence of the president and vice-presidents, the meeting shall elect their chairman, who may vote, and in like cases shall also have a casting vote.

4. The president, or two of the vice-presidents, shall have power to call a special meeting at forty-eight hours' notice; and on the receipt of the requisition of ten members the secretary shall call a meeting at not less than forty-eight hours' notice.

5. All proceedings of the Commissioners shall be entered in a minute book, and the first business at each meeting shall be the reading of the minutes of the preceding meeting, which shall, if necessary, be corrected, and when confirmed, be signed by the chairman.

6. Notices of meetings shall be delivered or transmitted by post within a reasonable time before the meeting.

7. No business other than as provided in Rule 1 shall be considered at any meeting, unless notice of the same has been previously given and circulated.

8. No motion, the effect of which, if carried, would be to rescind any motion which has already been passed by the Commissioners, shall be entertained, unless a special meeting of the whole of the Commissioners has been duly called for that purpose, upon the requisition of not less than twenty-five members.

9. For the more convenient disposal of the business of the Commission, committees shall be appointed, the chairman of each committee being an Executive Commissioner.

10. The press shall not be admitted to any meetings of committees, but such information regarding the business of committees as may be deemed desirable may be supplied to the press by the secretary on the authority of the chairman of any committee.

11. All receipts, income, and moneys from whatever source, received by or on account of the Commissioners, shall be paid forthwith into the City of Melbourne Bank or the Federal Bank, or such bank or banks as the Executive Commissioners may from time to time select, and shall be applied towards the building and management in connection with the erection, maintenance, and holding of the Exhibition in 1888 and 1889.

12. A finance committee, of which the chairman shall be treasurer to the Commissioners, shall supervise the receipts and expenditure. No moneys shall be paid out of the bank unless the accounts for the expenditure shall have been passed at a meeting of the finance committee, and then only by cheque, signed by two members of the committee, and countersigned by the secretary or his substitute. All vouchers shall be certified to by a responsible officer of the Commissioners as a guarantee of their

correctness; but no liability shall be incurred unless authorized by the Executive Commissioners. The Executive Commissioners may from time to time vote such sums as they think fit to committees either for particular expenditure or for the general purposes of such committees. The finance committee shall make no payments except such as have been so authorized.

13. All accounts, prior to payment, shall bear the certificate of the chairman of the committee authorizing them, and of the chairman of the finance committee.

14. The treasurer shall affix his signature to the Government forms for the accounts submitted.

15. The president, vice-presidents, and treasurer shall be members of all committees. Three members shall form a quorum of each committee, and the rules which regulate the procedure of the meetings of the Commissioners shall apply, as far as possible, to meetings of committees.

16. The seal of the Commissioners shall be kept in the custody of the secretary, and shall be attached by direction at a meeting of the Executive Commissioners to contracts entered into by them as evidencing the execution of such contracts.

17. All books and documents shall be kept at the offices of the Executive Commissioners. A minute book shall be kept for the use of each committee.

18. All appointments shall be made by the Executive Commissioners.

19. The Executive Commissioners shall have full authority to execute all the powers conferred upon the Commissioners; but shall report their proceedings from time to time to the full body of Commissioners.

II.—Officers and Employés.

20. Every person employed under the executive Commissioners must be prepared to devote himself exclusively to their service, paying prompt obedience to the orders of those who are placed in authority over him, and conforming to all such rules and regulations as may from time to time be made by the Commissioners.

21. The regular hours of attendance at the offices are from 9 a. m. to 4.30 p. m., and all persons employed therein will be required to sign an attendance book showing the times of their arrival at and departure from the offices; but all officers and servants must attend for the performance of such duties as may be required of them at such hours as may from time to time be necessary.

22. The private address of each officer or servant must be registered at the office of the secretary, so that if required for duty at any time other than the regular hours of attendance he can be found.

23. All officers and servants must, if required, find security in some approved guarantee society for such amount as may be decided upon by the Executive Commissioners.

24. All officers and servants must be prompt, civil, and obliging. They must at all times afford every proper facility for the conduct of business, but must not communicate any business of the Commissioners, unless specially directed so to do.

25. Each officer or servant will be held responsible for the particular work entrusted to him, and for the proper keeping by any subordinates who may be placed under him of all records, books, accounts, etc., connected with such work, and each officer responsible for any paper or document must initial the same.

26. Any officer or servant being unable to attend to his duties through ill-health or any other cause must at once advise the secretary to that effect in writing. If the cause be ill-health, and the consequent absence be likely to extend over one day, he must forward to the secretary, if required, a medical certificate stating the cause of his absence. Such certificate must, if required, be that of the chief medical officer. Neglect of attention to this rule will subject any officer or servant to the penalty of being dealt with for absenting himself without leave. Leave of absence from duty must be applied for, in all cases, to the secretary or, in his absence, to the officer acting. A record shall be kept of all cases where leave of absence *is granted.*

27. Every officer or servant is engaged during the pleasure of the Executive Commissioners, and is not entitled to any gratuity, compensation, or allowance on departure or dismissal from their service, neither shall he have any claim to salary or wages during absence from duty.

28. Insobriety, insubordination, or grave irregularity on the part of any person employed by the Executive Commissioners will be followed by immediate suspension, and may, if the Executive Commissioners think fit, result in dismissal.

29. The acceptance of any bribe, fee, gift, gratuity, testimonial, or favor of any kind is strictly forbidden, and if proven to have taken place will be followed by immediate dismissal.

30. In case any officer or servant has to complain of the conduct or irregularity of any fellow-officer or servant, such complaint must be made within forty-eight hours of the time of its coming to the knowledge of the person complaining. Any complaint lodged after that period has elapsed, unless good grounds can be shown for the delay, will be treated as being malicious, and not as for the benefit of the service.

31. No officer or servant shall leave the service of the Executive Commissioners without giving, in writing to the secretary, at least one week's notice from the next ensuing Saturday of his intention to do so, under penalty of forfeiting any salary or wages that may be due to him at the time of leaving.

32. No officer or servant who has been dismissed from the service of the Executive Commissioners for insobriety, acceptance of a gratuity from the public, inattention to duty, insubordination, or other grave irregularity, will be eligible for any subsequent appointment under the Executive Commissioners, or for employment in the Exhibition buildings or grounds in any position or capacity whatever.

33. Any officer or servant having any cause of complaint, or making application for increase of salary, must render the same in writing to the secretary, who shall forward the same to the proper committee for consideration. Personal applications to the Executive Commissioners will be treated as a breach of discipline, and dealt with accordingly.

34. Under directions from the Executive Commissioners, the secretary shall define the duties of all officers and servants.

35. No officer or servant will be considered to have entered the service of the Executive Commissioners until he shall have furnished the required security, whereupon he will receive a copy of these regulations, and will be required to give a receipt for them in a book kept for that purpose.

III.—Buildings and Grounds.

36. Unless authorized by the Executive Commissioners, no one shall enter the Exhibition buildings, gardens, or grounds. The price of admission to the Exhibition buildings, gardens, and grounds shall be such sum as the said Commissioners may deem advisable, during such hours and on such days as they may decide that the buildings and grounds may be kept open for the admission of the public.

37. No person visiting or walking through the gardens or grounds shall walk elsewhere than on the footpaths.

38. No person shall remove or damage any of the seats, lamps, trees, shrubs, grass, flowers, statuary, lakes, fountains, aquaria, fish, or birds, or any other material or property in the above-named buildings, gardens, and grounds; and no person shall throw stones or other missiles, or smoke, except in certain places set apart for the purpose, or light fires therein, or leave therein any bottles, orange peel, paper, cast-off clothing, or litter or refuse of any kind.

39. No person shall enter the buildings, gardens, or grounds otherwise than by the public gates, or climb or jump over the seats or fences in and around the said buildings, gardens, or grounds, or lie on the seats, or stick bills on the fences or on the

gates, or cut names, letters, or marks on the trees, seats, gates, posts, or fences, or otherwise deface the same, or write, print, stick, or distribute or scatter bills therein.

40. No person shall bring into the buildings, gardens, or grounds any horse, dog, or other animal, or any vehicle, except by special permission of the Executive Commissioners.

41. No child under seven years of age shall be allowed in the buildings, gardens, or grounds unless in charge of an adult.

42. Any person found in the Exhibition buildings, gardens, or grounds in a state of intoxication, or behaving in a disorderly manner, or creating or taking part in any disturbance, or committing in the said buildings, gardens, or grounds any act of indecency, or damaging the buildings or any part thereof, shall be expelled from the said building, gardens, and grounds, and may be forthwith removed therefrom by any Commissioner, or by any one authorized by a Commissioner, or any one in the employ of the Executive Commissioners, or by any constable; and any such person shall also be liable to prosecution for a breach of these regulations.

43. No persons, except artisans, laborers, or workmen employed in the gardens or grounds, shall enter any plots which may be inclosed within the said gardens, or grounds, and then only such plots as they may be employed in.

44. Any person who gains admission to the Exhibition buildings, gardens, or grounds otherwise than as herein provided, or, being in, does not observe these rules and regulations, shall be liable to be forthwith removed from the said buildings, gardens, and grounds, and also to be prosecuted as for a breach of the rules and regulations as the act directs.

45. Every Commissioner upon presenting his pass shall be deemed to be authorized by the Executive Commissioners to enter and visit any part of the buildings, gardens, or grounds.

46. In the case of machinery in motion, or other exhibits which in the opinion of the Executive Commissioners may be attended with danger to the public, exhibitors shall give a written guaranty indemnifying the Executive Commissioners against any liability which may be incurred on account of any accident or any injury of any kind arising therefrom.

47. Exhibitors may erect railings round their stands, subject to approval; in every instance these railings must be within the area of the space allotted. In the case of machinery in motion, it is imperative that it be efficiently protected to the satisfaction of the Executive Commissioners.

48. No exhibitor will be permitted to display exhibits in such a manner as to obstruct the light, or impede the view along the open spaces, or to occasion injury or inconvenience to other exhibitors.

49. Signs or name boards must be placed to the satisfaction of the Executive Commissioners and must in no case interfere with the lighting.

50. All hand-bills, printed matter, etc., connected with exhibits, and intended for gratuitous distribution, must first receive the approval and permission of the Executive Commissioners, which permission may be withdrawn at any time.

51. Exhibitors will be required to provide all necessary attendance to keep their stands and exhibits properly cleaned and in good order, and free from shavings, paper, or litter of any description during the whole period of the Exhibition.

52. The Executive Commissioners reserve the right to remove the exhibits of any one who does not conform to the regulations.

IV.—Fire and Sanitary.

53. No canvas or calico linings shall be allowed in any part of the Exhibition buildings, either as screens, ceilings, or for any other purpose, provided always that, in certain cases, if it shall appear to them necessary, the Executive Commissioners may grant special permission; but that in such cases the lining shall be previously

saturated with alum, or such other non-inflammable preparation as the said Commissioners may approve.

54. No movable gas brackets or other portable appliances for lighting shall be used in the Exhibition buildings.

55. All artificial light, except that created by ordinary coal gas or electricity, shall be prohibited, except in cases where it may be permitted by the Executive Commissioners under such restrictions as they may in the said cases adopt.

56. No artificial heat shall be applied to any oleaginous or inflammable substances; neither shall any exhibitor, employé, or any person visiting the Exhibition light or introduce any fire into any part of the buildings, unless when necessary for carrying out the works, or when otherwise authorized by the Executive Commissioners as a necessary part of machinery or other exhibits, and under such further regulations as may be adopted in such cases.

57. No shavings, straw, paper, packing, etc., or any inflammable material shall be allowed to remain in the buildings, gardens, or grounds.

58. No person shall light or assist in lighting any match, paper, wood, straw, or any other combustible material in the Exhibition buildings, gardens, or grounds, except by the direction of the Executive Commissioners, and any person who is found using any lighted pipe or open light in the buildings, gardens, or grounds shall be liable to prosecution for a breach of this regulation.

59. Refuse shall only be placed at the appointed places, and must be removed daily.

60. The chief executive officer of every court must take every precaution necessary to prevent fire, theft, or a breach of the sanitary regulations within his court.

61. Places will be provided in different parts of the buildings for the purposes of public convenience, and no person is permitted to use any other place; and if any one be found offending he will be liable to be permanently excluded from the buildings, gardens, and grounds, and in addition to be prosecuted for a breach of these regulations.

62. All employés of the Executive Commissioners are required to prevent any breach of these regulations.

V.—Storage of Empty Cases.

63. For the convenience of exhibitors, the Executive Commissioners will, if possible, enter into a contract or contracts on the best terms they can secure, with some person or persons to remove from the Exhibition buildings and grounds, store during the progress of the Exhibition, and return at its close to exhibitors or their accredited agents all empty cases or other articles.

VI.—Customs.

64. The Exhibition buildings and grounds are appointed a licensed bonding warehouse for the deposit of goods without the payment of duty, and all goods received therein shall be safely and securely kept until cleared thence as hereinafter provided.

65. All goods imported for exhibition purposes shall be entered by a bonding warrant for the exhibition bond, and the following declaration made:

I (importer, exhibitor, or agent) do hereby declare that I intend to exhibit the goods specified in this entry at the Centennial International Exhibition, to be held at Melbourne in the year 1888.

Witness my hand this day of , 1888.

_____.

and the packages containing such goods shall be sent from the wharf on landing by customs-licensed carriers only direct to the Exhibition buildings, where they must be unpacked in the presence of, and under the direction of, officers of customs duly appointed for the purpose, who will compare goods with invoices and otherwise examine such goods by weighing or measuring as may be required.

66. Invoices in duplicate of all goods entered for the Exhibition buildings must be produced to the officers of customs before such goods are unpacked, and after the goods have been examined and checked therewith, one copy of each of such invoices shall be retained by the officers of customs until such goods have been removed from the Exhibition buildings. Invoices must state what portion, if any, of the goods described therein is intended for sale. To facilitate examination foreign invoices should, when practicable, be made out in the English language.

67. Jewelry, watches, gold and silver plate, and such like articles must, immediately on arrival at the Exhibition buildings, be conveyed to a room specially provided for the safe custody of such articles, there to be unpacked and examined in the presence and under the directions of the officers of customs before being exhibited. And any such articles found exhibited without being first examined as herein provided, will be liable to forfeiture and the owners or exhibitors thereof to prosecution under the customs act.

68. Jewelry, watches, gold and silver plate, and such like articles must be placed in a show case or other receptacle duly approved by the proper officer of customs, to be secured by two locks, the key of one such lock to be retained by the exhibitor, and the key of the other to be retained by the officer of customs, such locks and keys to be provided by the exhibitor and approved by the proper officer of customs.

69. Wines, spirits, beer, tobacco, and cigars not required to be placed in show cases or on show stands, must be stored in a cellar specially set apart for the purpose, to be under the control of the proper officer of customs.

70. Immediately after the close of the Exhibition, exhibitors or their agents must clear all goods, either by export free or duty paid entry, or by transfer to another bonding warehouse, and complete such entries on or before the 31st day of March, 1889. Any goods not cleared as aforesaid may be transferred by the Executive Commissioners to another bonding warehouse at the owner's or exhibitor's risk and expense.

Arrangements Made for Storage of Empty Cases.

A contract has been entered into with Messrs. Thos. Walker & Co., of No. 1 Queen street, Melbourne, to remove from the Exhibition buildings and grounds, store during the progress of the Exhibition, and return at its close to exhibitors or their accredited agents, all empty cases or other articles at the rate of 4*s.* 10*d.* per ton of 40 cubic feet and 1*d.* per ton per week from four weeks after the termination of the Exhibition.

Arrangements for Cartage of Exhibits.

The Commissioners have arranged with Messrs. Thomas Watson & Sons to cart all exhibits from the wharves or railway stations at the price of 1*s.* 10½*d.* per ton weight.

Conditions for Wine and Beer Competition.

CLASSIFICATION OF WINES.

Wines will be classified as follows:

1. Natural Wines:—(*a*) Light. (*b*) Medium light. (*c*) Full-bodied.

Wines not exceeding 22 per cent. proof spirit to be classed as light; over 22 per cent., and not exceeding 26 per cent., medium light; and over 26 per cent., as full-bodied.

2. Fortified and Liqueur Wines:—(*a*) Dry. (*b*) Full-bodied. (*c*) Sweet.

Conditions of competition for special prize of fifty guineas, offered by Mr. P. B. Burgoyne, of London, for the best sample of a light beverage wine of a claret type, grown in the Australian colonies, taken from a quantity of 2,500 gallons, and produced at a price to popularize the wine in England and compete with the great bulk of continental wines which are sold there.

1. The wine to be of claret type, and not over an alcoholic strength of 26 per cent. proof, and shall be grown by the exhibitor.

2. One dozen bottles shall be submitted for the use of the jurors.

3. The quantity in bulk of the wine shall be not less than 2,500 gallons, and the prize will not be handed over until satisfactory proof is given that the bulk quantity stipulated is available for sale or export.

4. The selling price of the wine, delivered at Port Adelaide, Melbourne, or Sydney, shall be stated at the time of making the entry; and the exhibitor gaining the prize shall be bound, within fourteen days of the award, to sell the wine, at the price stated in the entry form, to any one willing to purchase the same for cash, except where there shall be more than one purchaser, in which case the grower shall be required to submit the wine to the competition of those persons who offer to purchase the same.

5. Entries will be received until 14th July, 1888, and samples of wine must be delivered at the exhibition building not later than the 1st of September, 1888.

6. Jurors will be appointed as provided for in the General Regulations of the Exhibition.

SPECIAL ENTRY FORM FOR BURGOYNE PRIZE OF FIFTY GUINEAS.

[Entries will be received until 14th July, and samples must be delivered not later than 1st September, 1888.]

1. Name of vineyard.
2. Where grown.
3. Quantity sent in for exhibition (not to be less than one dozen).
4. Year of vintage.
5. Name of grape or grapes from which wine was made.
6. Name of wine.
7. Strength proof spirit, if known.
8. Quantity available for sale.
9. Selling price per gallon at vineyard, in bulk.
10. How cultivated.
11. Remarks.

STATUTORY DECLARATION.

I,——— ———of———,in the colony of Victoria, do solemnly and sincerely declare that the statements made above are, to the best of my knowledge and belief, correct; that my exhibits of wine are made from grapes of my own growth, or such as I purchased, and whose kind I ascertained; that no alcohol, ether, glucose, glycerine, sugar, coloring matter, or other material for giving character, has been added; and that the exhibit is a fair sample of bulk. And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an act of Parliament of Victoria rendering persons making a false declaration punishable for willful and corrupt perjury.

Declared in Victoria this ——— day of ———,1888, before me ———————.

(Signature of Exhibitor.) ——— ———.

Exhibitors of wine, beer, spirits, mineral and aerated waters, cordials, etc., for competition are requested to send in their exhibits without delay, in order that the cellarage required by competitive exhibits may be ascertained and accommodation reserved.

Sample bottles of wine to be sold on and after the opening of the Exhibition must be forwarded to the wine committee for approval on or before the 15th July, 1888.

Three bottles of each sample of wine to be offered for sale must be sent to the wine committee for approval before being exposed for sale at the bars.

Storage will be provided for wine for sale, not exceeding fifty cases (containing one dozen quarts each) to each exhibitor.

Bottled wines and beers must be securely packed in cases of one dozen for quarts and two dozen for pints.

REGULATIONS FOR SALE OF WINES AT AUSTRALIAN WINE BAR AND CELLAR BARS.

Exhibitors of wine may sell only at the bars under the Commissioners' control.

Australian wines, with the exception of champagne, are to be sold at a uniform rate of 3*d.* per glass, running eight to the bottle. Bottled wines to be sold at 1*s.* per pint and 2*s.* per quart bottle, to be consumed in the building. The whole of the money so realized will be put into a common fund, from which, after expenses have been deducted, each exhibitor will periodically be returned a sum proportionate to the consumption of his wines, at a uniform price per dozen.

The Commissioners' bars will be under the control of a competent officer, appointed by the wine committee.

VICTORIAN CHAMPAGNE.

Exhibitors of this wine must state the selling price per dozen and bottle, and 10 per cent. will be deducted for expenses of distribution from the money received from sales at the bars.

Cases containing wine for sale at these bars must be distinctly marked "For sale," and three bottles of each sample must be sent to the wine committee for approval before being exposed for sale at the bars. Sample bottles of wine to be sold at the opening of the Exhibition must be forwarded to the wine committee for approval on or before the 14th July, 1888.

Cellarage for wine for sale will be provided, not exceeding fifty cases for each exhibitor.

No exhibits will be admitted after the 14th July, 1888.

BEERS.

Beers for competition will be classed as under:

1. BEER IN BULK.

(*a*) *Running ale.*—Market value, £2 10*s.* to £3 per hogshead, light and palatable; to be used within a month, and should be judged within that time from its coming in.

(*b*) *Malt bitter ale.*—Market value, £4 to £4 10*s.* per hogshead, light, palatable, and sound, flavor of hops, brewed without sugar, and to keep for six or twelve months, if necessary.

(*c*) *Strong ale, XXXX.*—Market value, £5 or over. Characteristics after style and taste of imported British ale, and to keep good and sound quite as long.

(*d*) *Stout in bulk.*—Market value, £5. One class will be ample.

2. BOTTLED BEER.

(*a*) *Ordinary sparkling ale.*—To be judged within a month; price about 4*s.* 6*d.* per dozen.

(*b*) *Malt bitter ale.*—To keep any time required; price about 5*s.* 6*d.* per dozen.

(*c*) *Strong ale.*—To keep any time required; price about 7*s.* 6*d.* per dozen.

(*d*) *Stout.*—To be judged within a month; price about 4*s.* 6*d.* per dozen.

3. LAGER BEER.

(*a*) *Australian* (*bottled*).—To be judged within a month; price about 6*s.* per dozen, bulk.

(*b*) *Imported* (*bottled*).—To keep any time required; price about 10*s.* per dozen, duty paid, bulk.

SALE OF BEERS.

Permission has been given by the Executive Commissioners for the erection, by and at the expense of exhibitors, of two kiosks, on sites to be indicated on the grounds, one for retailing Australasian and the other for retailing British and foreign beers.

They will be managed by the caterer, Mr. H. Skinner, of Clarendon street, South Melbourne, with whom exhibitors who desire their beer sold must communicate, and further arrange amongst themselves to put up the kiosks. When the kiosks are erected the Commissioners will frame regulations for their control and for the sale of beers.

Selling prices to be verified by affidavit.

The jury to have special regard in judging to the following conditions: (1) brilliancy, (2) full flavor, (3) natural stability of head, (4) general condition as to age and class, (5) selling price.

Brewers are requested to mark their names and the class under which they desire to enter distinctly on each hogshead or case sent in.

In judging, all names, trade-marks, etc., will be concealed and a system of running numbers adopted for reference.

Cellarage will be provided for beer for sale, not exceeding 30 cases and 10 casks for each exhibitor.

SPIRITS.

Spirits will be classed as under:

(1) Colonial.

(2) Imported.

SALE OF TEA, COFFEE, CHOCOLATE, COCOA, ETC.

Permission has also been granted for the erection, by and at the expense of exhibitors, of a kiosk, on a site to be indicated on the grounds. This kiosk will be for the sale, as a beverage, of tea, coffee, chocolate, cocoa, etc., and will be under the management of the temperance caterer, Mr. William Thomson, of Clarendon street, South Melbourne, with whom exhibitors who desire to sell their tea, coffee, chocolate, cocoa, etc., must communicate and further arrange amongst themselves for the erection of the kiosk. When the kiosk is erected the Commissioners will frame regulations for its control and for the sale of tea, coffee, chocolate, cocoa, etc.

GEO. T. A. LAVATER,
Secretary.

RULES AND REGULATIONS ABSTRACTED FROM THE OFFICIAL CIRCULAR.

APPLICATIONS FOR SPACE.

1. Governments intending to take part in this Exhibition are requested to forward an intimation to that effect not later than the 31st August, 1887.

2. Applications for space, with full particulars, are invited as early as possible. Copies of the official form of entry can be obtained upon application to the secretary to the Commissioners, through the representatives of the country or colony to which the applicants belong. In the event of no representatives being appointed by the country or colony to which an intending exhibitor belongs, he can communicate direct with the secretary. Applications for space should be made not later than the 31st October, 1887. Space assigned to countries and colonies, and not occupied on the 30th June, 1888, will revert to the Executive Commissioners, and will be subject to rearrangement. Space will not be charged for, but power will be reserved by the Executive Commissioners to reduce the space allotted to any Government or exhibitor, should they deem fit at any time.

3. British, foreign, and colonial Governments, or Commissioners appointed by them, are requested to inform the Executive Commissioners, Melbourne, not later than the 31st December, 1887, whether they require any increase or diminution of the space offered them, and the quantity. They are also requested to state whether there will be any exhibits for which special space should be provided, together with a description showing their nature and bulk.

4. Before the 31st May, 1888, the representatives of countries or colonies should furnish, for the approval of the Executive Commissioners, approximate plans, showing the manner in which they propose to allot the space assigned to them, together with lists of their exhibitors, and any other information necessary for the compilation of the Official Catalogue. (*Vide* No. 13.)

SHIPMENT OF EXHIBITS.

5. Commissioners representing countries or colonies, and private exhibitors whose countries are not officially represented, but to whom space has been allotted, may adopt one of two courses, viz:

(*a*) They can ship their exhibits direct to Melbourne, and make their own arrangements for their shipment, reception, and exhibition;

(*b*) Or consign their exhibits, freight, and expenses prepaid, to "The Secretary Centennial International Exhibition, 1888, Melbourne, Australia," with specific instructions as to what is desired. Where it is found necessary to incur expenses on exhibits consigned to the secretary, such expenses will be a first charge on such exhibits.

MARKS AND ADDRESS ON PACKAGES.

6. Packages forwarded from countries and colonies represented at the Exhibition should be addressed "To the Commissioner for ———, Centennial International Exhibition, 1888, Melbourne, Victoria, Australia," and the following information must be written on the outside of each package: (1) The country from which the package comes. (2) Name or firm of exhibitor. (3) Address of the exhibitor. (4) Group and class to which exhibits belong. (5) Total number of packages sent by same exhibitor. (6) Serial number of that particular package. Each package must contain a list of contents.

Packages containing goods intended for the Exhibition must likewise have painted on them, as a distinctive mark, the following letters and figures within a triangle thus—

Packages from foreign countries must also be marked with the colors and devices of their national flag. Foreign Commissioners are particularly requested to send to the Executive Commissioners, Melbourne, as soon as possible, a specification of the packages forwarded, with their distinguishing marks.

CUSTOMS DUTIES, ENTRIES, ETC.

7. Exhibits will be admitted free of duty for the purpose of exhibition. Customs entries, transportation, receiving, unpacking, and arranging the products for exhibition must be undertaken by the exhibitor, at his own expense.

TRANSPORT.

8. No charge will be made for carriage of goods intended for exhibition over the railway lines.

Arrangements will be made by which all goods intended for exhibition can be carted from the wharves, or the several railway stations, to the Exhibition grounds at a fixed scale of charges.

REMOVAL OF GOODS.

9. The removal of goods, except under special circumstances, will not be permitted during the period the Exhibition is open. Delivery of exhibits sold will not be al-

lowed until after the close of the Exhibition. Special permits for the sale and delivery of goods and articles manufactured in and during the progress of the Exhibition may be given by the Executive Commissioners, should they deem fit.

PROTECTION TO INVENTORS AND OTHERS.

10. The protection of inventions capable of being patented, and of designs, is secured by the patent laws of Victoria. No work of art, nor any article whatever, exhibited in the buildings, parks, or gardens, may be drawn, copied, or reproduced in any manner whatsoever without the permission of the exhibition. The Executive Commissioners reserve to themselves the right of authorizing the production of general views.

Sketches, drawings, photographs, or other reproductions of articles exhibited will only be allowed upon the consent of the exhibitor and the approval of the Executive Commissioners; but views of portions of the building may be taken upon the sanction of the Executive Commissioners alone.

GOODS REQUIRING SPECIAL WORK OR ACCOMMODATION.

11. The placing and fixing of heavy articles requiring extra foundations or adjustment should begin by special arrangement as soon as the progress of the work upon the Exhibition buildings will permit. The general reception of articles in the Exhibition buildings will commence on the 1st May, 1888, and no articles will be admitted after the 15th July, 1888. The plans for the display and accommodation of objects that require either special arrangements or exceptional works for their display must receive the approval of the Executive Commissioners before work is commenced, and all such works must be carried out under the supervision of their officers. The works of general fitting-up must be commenced not later than the 1st June, 1888, and the Courts must be ready to receive goods before the 1st May, 1888.

The Executive Commissioners, if they deem fit, will grant permission for the erection of approved special constructions in the buildings or grounds, at the cost of the exhibitor.

EXHIBITS NOT FOR COMPETITION.

12. If exhibits are not intended for competition, it must be so stated by the exhibitor, and they will be excluded from examination by the jurors.

OFFICIAL CATALOGUE.

13. An Official Catalogue will be published in English by the Executive Commissioners, by whom the sale of catalogues is reserved. Anything beyond the ordinary description of the exhibit, together with the name of the exhibitor, must be paid for at the rate of five shillings per line. Exhibitors desiring to utilize the catalogue for advertising purposes should communicate as early as possible on the subject with the secretary. Each county and colony will, however, have the right of producing, at its own expense, but in its own language only, a special catalogue of the objects exhibited in its section. Such catalogue, however, must not be offered for sale in this colony, or be used as a medium for advertising.

GROUPING EXHIBITS.

14. The representatives of countries and colonies will be allowed to group their exhibits as they may think fit in that portion of the Exhibition buildings allotted to the country or colony which they represent. The Executive Commissioners desire, however, that where International Courts can be formed, special classes of exhibits of all nations, and of the same character, shall be exhibited together. Victorian exhibits will be grouped in classes, irrespective of districts.

15. Exhibits from any country or colony whose Government is not represented must

be classified according to the following groups. The same direction will be followed in the catalogue:

(1) Works of art.
(2) Education and instruction—Apparatus and processes of the liberal arts.
(3) Furniture and accessories.
(4) Fictile manufactures, glass, pottery, etc.
(5) Textile fabrics, clothing, and accessories.
(6) Raw and manufactured processes and products.
(7) Machinery—Apparatus and processes used in the mechanical industries.
(8) Alimentary products.
(9) Sanitation, medicine, hygiene, and public relief.
(10) Agriculture and associated industries.
(11) Horticulture.
(12) Mining industries—Machinery, processes, and products.

Any expenses incurred by the Executive Commissioners in the display and exhibition of these goods will be made a first charge upon such goods.

Each of these groups is divided into classes, according to the system of general classification annexed to these regulations, in an appendix, which includes for each class an enumeration of the nature of the objects which it will comprise.

MOTIVE POWER FOR EXHIBITS.

16. Motive power will be supplied to suitable exhibits free on application to the Executive Commissioners, but the latter reserve to themselves the power to reduce the amount asked for, or to make a charge for a certain portion of the motive power supplied, if they consider necessary. The Executive Commissioners desire to encourage the display of machinery in motion, and of all descriptions of manufactures, etc., in progress, and they will endeavor to provide adequate power to meet all reasonable demands. By the introduction of steam power it is proposed to afford facilities for presenting not only the machinery for any given manufactures, but also the processes of manufacture. Requests for motive power must be made to the Executive Commissioners prior to 31st March, 1888.

17. All shafting, pulleys, belting, connections, etc., for the transmission of power from the main shafting must be provided by and at the cost of the exhibitor.

18. It is further intended that space shall be afforded for the production of interesting objects by manual labor.

FITTINGS, ETC.

19. Exhibitors must provide at their own cost all show-cases, shelving, counters, fittings, etc., which they may require.

RIGHT TO REJECT EXHIBITS.

20. The Executive Commissioners reserve the right of rejecting or returning any proposed exhibit. Articles that are in any way dangerous, or offensive or injurious to public decency and morality, will not be admitted into, or to be allowed exhibited in the Exhibition.

WORKS OF ART.

21. The following special regulations are framed for the reception and admission of works of art. The works admissible include the five classes mentioned below:

(1) Paintings.
(2) Drawings, water-colors, crayon drawings, miniatures, enamels, porcelain, designs in glass and clay, designs for stained-glass windows, and mosaic work.
(3) Sculpture and die-sinking, and engraving on precious stones.
(4) Architectural and engineering drawings and models.
(5) Engraving and lithography.

The following are excluded:

(1) Unframed pictures or drawings.

(2) Sculpture in unbaked clay.

The duty of deciding upon the admission of works of art will devolve upon a Special Committee. Suitable space, which will be lighted by electricity, will be reserved for the exhibition of paintings. Other regulations will give information as to the dispatch and reception of works of art.

FIRE, ACCIDENTS, ETC.

22. The Executive Commissioners will take precautions for the safe preservation of all objects in the Exhibition, but will be in no way responsible for damage or loss of any kind, or accidents by fire or otherwise, however caused. In order, however, to reduce the danger of fire to a minimum, a special fire brigade will be formed, and be available, in connection with the Exhibition, from the time of the reception of exhibits to its close.

INSURANCE, ETC.

23. Facilities will be afforded the representatives of countries and colonies, and private exhibitors, for insuring their goods; and they may also employ watchmen, at their own expense, to guard their goods during the hours the Exhibition is open to the public. The appointment of such watchmen will be subject to the approval of the Executive Commissioners. These persons must wear a special dress or distinctive badge.

AWARDS.

24. The following is the system under which the awards will be made:

The awards will be based upon written reports adopted by the jurors.

The jurors will be selected for their qualifications and character, and shall be experts in the departments to which they are especially assigned; the British, foreign, and colonial jurors shall be nominated by the representatives of each country or colony exhibiting, and, if approved of, will be appointed by the Executive Commissioners, who will appoint those for Victoria.

Jurors will be reimbursed such personal expenses as may be allowed by the Executive Commissioners.

The jurors' report and the Executive Commissioners' awards will be based upon the inherent and comparative merits of the individual exhibits, the elements of merit being held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy, cost, and importance of interests involved.

Each report must be delivered to the secretary to the Executive Commissioners as soon as completed.

Awards will consist of gold, silver, and bronze medals, and certificates of honorable mention, together with a special report of the jurors on the subject of the award. A certificate will accompany each medal.

Each exhibitor shall have the right to produce and publish the report awarded to him, but the Executive Commissioners reserve the right to publish and dispose of all reports in any manner they may think best for public information.

25. Immediately after the close of the Exhibition exhibitors, or their duly appointed agents, shall remove their effects, and complete such removal by the 31st March, 1889. Goods then remaining will be removed by the orders of the Executive Commissioners, and sold by auction, or otherwise disposed of, under the direction of the Executive Commissioners, and the net proceeds handed to the exhibitors or their duly appointed agents.

26. Every person who becomes an exhibitor thereby acknowledges, and undertakes to observe, the rules and regulations established from time to time for the government of the Exhibition.

27. The Executive Commissioners reserve the right to alter, explain, amend, or add to these regulations, at any time, whatever may be deemed necessary.

Information upon any question of details can be obtained upon application to the agent-general for Victoria, 8 Victoria Chambers, Victoria street, Westminster, London, S. W., or to the Executive Commissioners, Centennial International Exhibition, 1888, Melbourne, Australia.

JURY REGULATIONS.

EXHIBITS AND EXHIBITORS.

1. No exhibit will be allowed to compete for awards which is not entered in the Official Catalogue, in one or other of its editions, unless the exhibitor is able to prove to the satisfaction of the Executive Commissioners that the omission to enter it in the catalogue arose from the delay in its arrival, or is due to causes arising subsequently to its dispatch from its place of origin, and entirely beyond his own control. Perishable articles alone are exempted from this rule.

2. The classification of articles for competition, in case of dispute, shall be decided by the chairman of juries, subject to the approval of the Executive Commissioners.

3. Exhibits that are not the produce or manufacture of the country in whose court they are exhibited shall not be allowed to enter into competition as the produce or manufacture of such country, and an exhibitor who is not the manufacturer, producer, inventor, or designer of the article exhibited by him shall not be considered as entitled to an award.

4. Collective exhibits shall, as a rule, be judged in their entirety as one, and such collection must be the products or manufactures of the individual or firm exhibiting. Should, however, an exhibitor or firm desire otherwise, and supply the chairman of juries with due notice and the necessary information as to his or their exhibit, it may be divided, and parts judged separately at the discretion of the chairman of juries; in such case it shall not be eligible for award as a collective exhibit.

5. Exhibitors must forward to the chairman of juries any information they desire to have placed before the jury of the section in which the exhibitor's goods are, prior to the commencement of its labors.

6. Exhibitors will be invited to appear personally, or by representative, or by letter before the jury appointed for the section or sub-section in which the exhibitor's goods are, should the jury desire further information.

7. Each exhibitor shall have the right to produce and publish the report awarded to him, but the Executive Commissioners reserve the right to publish and dispose of all reports in the manner they think best for public information, and to embody and distribute the reports as records of the Exhibition.

JURORS.

8. The jurors will be selected for their qualifications and character, and shall be experts in the departments to which they are especially assigned; the British, foreign, and colonial jurors shall be nominated by the representatives of each country or colony (then residing in Victoria) exhibiting, and, if approved of, will be appointed by the Executive Commissioners, who will also appoint those for Victoria.

9. No Commissioner who is an exhibitor, or a member of any firm exhibiting, or agent representing any house, firm, or firms, shall act as juror in those sections or sub-sections allotted to a jury in which he exhibits, and no person interested, either as a partner or employé, in a house exhibiting, shall be a juror in any section or subsection in which such house exhibits.

10. The British, Foreign, and Colonial Courts in the Exhibition (other than Victoria) shall each be allowed, through their representative Commissioner or Commissioners, now for a time domiciled in Victoria, to nominate one juror on each jury, irrespective of nationality or place of residence, and the Victorian Commissioners may

nominate and appoint an equal number on each jury of the total number representing each of the before-mentioned courts. Where no nominations are made, the Executive Commissioners of Victoria shall themselves make the appointments, and such person or persons so appointed shall severally represent on the jury to which he or they shall be appointed the interests of the country for which the appointment has been made.

11. In the case of any country (other than Victoria) exhibiting in great variety a large collection (not being duplicates) of fine arts, industrial exhibits, machinery, or agricultural implements, the Executive Commissioners retain the right to allow, or otherwise, a further addition of one representative or more to the jury or juries nominated by the country so exhibiting, such additional nomination to be made by the country concerned.

12. In the event of the continued non-attendance of any juror over three consecutive sittings, the authority that made the nomination may be called upon by the jury or chairman of juries to nominate another juror or substitute, and the original juror's appointment shall be thereupon canceled.

13. Each juror shall have one vote only, save and except the chairman of each jury, who shall, upon the votes being equal, have also a casting vote.

14. Each juror shall receive a pass (not transferable) that will admit him to the Exhibition buildings during the hours of attendance, and shall wear a ribbon while adjudicating.

JURIES.

15. Juries shall be called together as early as possible after appointment, and each jury shall choose its own chairman, who shall convene meetings, preside over debates, and see that the business transacted is entered in the minute book by the clerk of the jury. In the absence of the chairman, the jury shall elect one of themselves to act as chairman for that meeting.

16. The duty of each jury shall be to examine the exhibits that belong to the class under its control, to be assured that each article is properly named, and whether free from sophistication or otherwise, and make other arrangements as may be decided upon for the due and proper examination of each collective exhibit or otherwise, before proposing the order of award it is, in their judgment, entitled to receive.

17. Juries shall, if they consider it necessary, subdivide sections into special divisions (subject to the approval of the chairman of juries), and propose awards in such special divisions.

18. The jurors' reports and awards must be based upon the inherent and comparative merits of the individual exhibits, the elements of merit being held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy, cost, and importance of interests involved. Each report must be delivered to the chairman of juries as soon as completed, and by him forwarded to the Executive Commissioners, together with his remarks thereon. The Executive Commissioners reserve the right to adopt the reports or otherwise before finally making or confirming the awards.

19. Awards will consist of gold, silver, and bronze medals, and certificates of honorable mention, together with a special report of the jurors on the subject of the award. A certificate will accompany each medal.

20. Juries shall have the power to invite the co-operation of jurors from other sections, subject to the provision made in clause 9; and in the event of any jury desiring to call in the aid of outside experts on any particular exhibit, it shall be referred to the chairman of juries, together with the reasons for such aid being required, who shall decide, or refer, if he desires, the application to the Committee of Juries and Awards, whose decision shall be final. The appointment of experts shall be made as follows: One by the jury and one by the chairman of juries.

21. In order to pass a resolution requiring outside experts, or for the purpose of making an award, a quorum of not less than half the members, besides the chairman of the jury for the time being, shall be present. No sub-jury shall make awards, but

may recommend to the full jury. All decisions must be carried by a majority of those present belonging to the jury appointed.

22. Each jury shall fix its own quorum, subject to the approval of the chairman of juries.

23. The minutes of all meetings must be submitted by the clerk of the jury to the chairman of juries within two days after each meeting.

24. When a jury is reporting the result of its examination of the several exhibits it shall furnish a statement in writing, giving the specific reasons for which each award shall have been made, and each report shall be signed by the chairman of the jury or a majority of those forming the jury, and delivered to the chairman of juries as soon as completed.

25. The reports of the juries shall name the exhibitors who deserve recognition, and shall recommend the award made by them, whether it shall be of gold, silver, or bronze medals, or certificates of honorable mention. A careful, and, as far as possible, a full report shall accompany the award report, setting forth the merits of any particular exhibit, and also the views of the jury on the general technic character of the exhibits which came under their observation.

26. The position of a juror shall be an honorary one, excepting so far as expenses (duly authorized) are concerned. All expenditure of money by juries shall be arranged for through the chairman of juries.

27. Clerks will be provided for each jury, and each clerk shall be subject to the directions of the chairman of juries.

28. Experts acting with any jury shall in no case compete for awards in any class in which they are acting.

29. All appeals against decisions of juries shall be submitted to the chairman of juries, who shall have the power to call in or consult with independent experts, and on their advice may refer back to the jury, or otherwise, whose decision shall have been appealed against. The appellant must deposit with the chairman of juries the fee to be paid to the experts, which will be fixed by the Executive Commissioners. If the appeal is sustained, the fee will be returned.

30. In the event of a jury and the experts failing to agree, the chairman of juries shall submit the reports of the jury and experts, together with his own report, to the Executive Commissioners, whose decision shall be final.

31. The chairman of juries may be present at any meeting of jurors, and shall collect and submit all documents intended for the consideration of juries, send out notices of jury meetings, stating the business of the meeting, inform the Foreign Commissioners and exhibitors of the days upon which examination of their exhibits will be made by juries, and give all information and procure all assistance and appliances necessary for making awards.

32. All references or reports by the chairman of juries to the Executive Commissioners shall be made through the committee of juries and awards, and shall be accompanied by the opinion of such committee upon the matter.

33. The Executive Commissioners reserve the right to alter, explain, amend, or add to these regulations at any time whatever may be deemed necessary.

Approved and adopted by the Executive Commissioners at a meeting held at the Exhibition offices on Monday, 16th July, 1888.

JOSEPH BOSISTO,
Chairman of Juries.

REGULATIONS CONCERNING THE DISPATCH, RECEPTION, ARRANGEMENT, AND RETURN OF THE GOODS EXHIBITED, AND DISPOSAL OF SPACE.

1. Every person admitted as an exhibitor will receive, in Melbourne, and with the least possible delay, an exhibitor's ticket, showing his rotation number and the dimensions of the space allotted to him.

He will receive at the same time printed labels to be affixed to the packages he *may send to the Exhibition.*

2. The labels supplied to exhibitors will be printed on paper of different colors according to the group to which the products to be exhibited may belong.

The conventional colors adopted are as follows:

Group 1.	Works of art	Pink.
2.	Education and instruction, apparatus, and processes of the liberal arts	White.
3.	Furniture and accessories	Blue.
4.	Fictile manufactures, glass, pottery, etc	Buff.
5.	Textile fabrics, clothing and accessories	Bright yellow.
6.	Raw and manufactured processes and products	Brown.
7.	Apparatus and processes used in the mechanical industries	Red.
8.	Alimentary products	Violet.
9.	Sanitation, medicine, hygiene, and public relief	Black.
10.	Agriculture and associated industries	Dark green.
11.	Horticulture	Light green.
12.	Mining industries—machinery, processes, and products	Gray.

3. The Commissioners place at the disposal of countries and colonies all information and plans which may be useful for their arrangements.

4. Exchanges of space can not be made without the consent of the Executive Commissioners.

5. Exhibitors will not have to pay rent for the space occupied by them in the Exhibition. The flooring will be provided in sound condition and ready for use within the whole of the main building; but the flooring must not be altered, removed, or strengthened, for the exhibition of machinery, convenience of arrangement, or any other purpose, except with the consent of the Executive Commissioners, and at the expense of the exhibitors.

6. The spaces reserved outside the Exhibition allotments being strictly calculated with a view to the necessities of circulation, packages and empty cases will not be allowed to remain there.

Cases must, therefore, be unpacked as early as possible after their reception, and the empty cases at once taken away by the exhibitors or their agents.

Should the exhibitors neglect to carry out in the manner thus indicated the unpacking of the goods and the removal of the empty cases, the work will be undertaken by the Executive Commissioners, but in no case will the Commissioners incur any responsibility whatsoever in the execution of this duty. The Commissioners will have nothing to do with the warehousing and preservation of the empty cases; neither have any arrangements been made, nor any space reserved, for the purpose. Exhibitors who may be unable to provide for the removal and preservation of their empty cases are advised to communicate with the secretary.

GENERAL ARRANGEMENTS.

7. Certain products, which it may be found impossible to display in the main buildings, will in some exceptional cases be exhibited in the surrounding parks and gardens, in buildings erected for the purpose.

8. With regard to the Victorian section, the Commissioners will place themselves in communication with the committees established in each locality. The duties of these committees will be:

(1) To make known the rules concerning the Exhibition, and to distribute the forms of application for space, as well as all other documents relating to the Exhibition.

(2) To point out as soon as possible the principal artists, agriculturists, and manufacturers whose exhibits would appear to be particularly calculated to promote the success of the undertaking.

(3) To encourage the exhibition of the manufactures, and of the mineral, pastoral,

agricultural, and horticultural products of the district, and to accredit to the Commissioners the delegate charged with their representation.

9. Spirits or alcohol, oils and essences, corrosive substances, and generally all substances which might spoil other articles or inconvenience the public, can only be received in solid and suitable vessels of small size.

Percussion caps, fire-works, chemical matches, and similar articles can only be received when made in imitation, and deprived of all inflammable ingredients.

10. Exhibitors of objects of a disagreeable nature, or such as may be prejudicial to health, will be bound at all times to conform to such precautionary measures as may be considered necessary.

11. The Commissioners reserve the absolute right to cause the removal of any article whatever, if, on account of its nature or appearance, they deem it advisable to do so.

12. All goods must be exhibited under the name of the person who has signed the application for admission.

13. Exhibitors are entitled to insert after their name, or that of their firm, the names of their assistants of every class and grade who may have taken part in the production of the goods exhibited.

14. Exhibitors are particularly requested to mark the trade price of the articles exhibited, so as to facilitate the judgment of the jury, as well as for the information of visitors.

15. Persons desirous of exhibiting articles not mentioned in the general classification may apply to the Executive Commissioners.

ADMINISTRATION.

16. A general supervision will be established for the prevention of robbery and embezzlement.

17. It must be distinctly understood that the Commissioners decline all responsibility for any theft or embezzlement which may be committed.

18. In the Victorian section the exhibitors of each class must arrange among themselves as to the organization of a staff of attendants independent of the general supervision established by the Commissioners. Private agents of this description must be approved by the Commissioners, and must wear badges bearing the number of the class to which they will be attached.

19. All communications relating to the Exhibition must be addressed "The Executive Commissioners, Centennial International Exhibition, 1888, Melbourne, Australia."

SYSTEM OF GENERAL CLASSIFICATION.

[N. B.—The arrangement made in this classification will be found to deviate somewhat from that in the Official Catalogue. This alteration is intended to assist the jurors in their work only.]

FIRST GROUP.—WORKS OF ART.

CLASS 1.—*Paintings in oil and water-colors.*

Paintings on canvas, on panel, and on other grounds. Miniatures, water-color paintings, pastels, and drawings of every kind.

CLASS 2.—*Various paintings, drawings, etc.*

Paintings on enamel, earthenware, and porcelain; odd designs in porcelain, glass, and clay; cartoons for stained-glass windows and frescoes, etc.; other designs (except those exhibited by the Technical Schools).

CLASS 3.—*Sculpture and die-sinking.*

Sculpture of all kinds, chased and repoussé work. Medals, cameos, engraved stones. Niello work. Statues and bas-reliefs, in bronze, cast-iron, zinc, etc.

CLASS 4.—*Engravings and lithographs.*

Engravings, colored engravings. Lithographs executed with pencils and with brush, chromo-lithographs, engraved stones, etc.

SECOND GROUP.—EDUCATION AND INSTRUCTION; APPARATUS AND PROCESSES OF THE LIBERAL ARTS.

CLASS 5.—*Education of children, primary instruction, instruction of adults.*

Plans and models of orphan asylums, infant schools; systems of management and furniture of such establishments; appliances for instruction suitable for the physical, moral, and intellectual training of the child previous to its entering school.

Plans and models of scholastic establishments for town and country; system of mangement and furniture for these establishments. Appliances for instruction: school books, educational maps, apparatus, and models.

Plans and models of scholastic establishments for adult and professional instruction. System of management and furniture for these establishments. Appliances for adult and professional instruction.

Appliances for the elementary teaching of music, singing, foreign languages, book-keeping, political economy, practical agriculture, horticulture, floriculture, technology, and drawing.

Appliances adapted to the instruction of the blind, and of deaf-mutes.

Works of pupils of both sexes.

Libraries and publications.

CLASS 6.—*Organization and appliances for secondary instruction.*

Plans and models of establishments for secondary instruction, lyceums, grammar schools, colleges, industrial and commercial schools. Arrangement and furniture of such establishments.

Collections, classical works, maps, and globes.

Appliances for technological and scientific instruction, and for teaching the fine arts, drawing, music, and singing.

Apparatus and methods for instruction in gymnastics, fencing, and military exercises.

CLASS 7.—*Organization, methods, and appliances for superior instruction.*

Plans and models of universities, medical schools, academies, technical and practical schools, schools of agriculture, observatories, scientific museums, amphitheaters, lecture-rooms, laboratories for instruction and research.

Furniture and arrangement of such establishments.

Apparatus, collections, and appliances intended for higher instruction and scientific research.

Special exhibitions of learned, technical, agricultural, commercial, and industrial societies and institutions.

Scientific expeditions.

Collection of drawings of terrestrial and amphibious animals, of birds, eggs, fishes, mollusca, and crustacea. Preserved birds, fishes, and animals.

CLASS 8.—*Architectural and engineering drawings and models.*

Elevations and plans. Studies and details. Restorations based upon existing ruins or documents, etc.

CLASS 9.—*General application of the arts of drawing and modeling.*

Designs for industrial purposes; designs obtained, reproduced, or reduced by mechanical processes. Decorative paintings, lithogra hs, chromo-lithographs, or engravings for industrial purposes. Models and small articulated wooden models of figures, ornaments, etc.

Carvings. Cameos, seals, and various objects decorated with engraving. Objects modeled for industrial purposes produced by mechanical processes, reductions, photo-sculpture, etc. Casts.

CLASS 10.—*Printing and books.*

Specimens of typography; autographic groups; lithographic proofs, black or colored proofs of engravings.

New books and new editions of books already known; collections of works forming special libraries; newspapers; periodical publications. Drawings, atlases, and albums.

CLASS 11.—*Stationery, book-binding, painting, and drawing materials.*

Paper; card and pasteboard and paper-making materials; inks; chalks; pens; pencils; pastels; all things necessary for writing-desks and offices; inkstands; apparatus for weighing letters, etc.; copying presses.

Objects made of paper; lamp shades, lanterns, flower-pot covers.

Registers, copy-books, albums, and memorandum books; bindings, loose covers for books, and paper for covering, book-binding, cases, etc.

Various products used in water-color painting and tinting; colors in cakes, pastels, bladders, tubes, and shells. Instruments and apparatus for the use of painters, draughtsmen, engravers, and modelers.

CLASS 12.—*Photographic proofs and apparatus.*

Photographs on paper, glass, wood, stuffs, and enamel. Heliographic engravings lithographic proofs, photo-lithographic proofs, photographic stereotypes, stereoscopic proofs, and stereoscopes. Enlarged photographs, color photographs.

Instruments, apparatus, and chemicals necessary for photography. Materials and appliances used in photographic studios.

CLASS 13.—*Musical instruments.*

Wind instruments, with key-boards and pianos.
Organs, harmoniums, accordeons.
Automaton instruments, barrel organs and bird organs.
Separate parts of organs and other key-board instruments.

CLASS 14.—*Stringed instruments, with and without key-boards.*

Stringed instruments played with the fingers, without key-boards.
Harps, guitars, etc.
Instruments played by percussion or friction.
Dulcimers, etc.
Separate parts of musical instruments (other than organs and harmoniums).
Non-metallic wind instruments, with common mouth-pieces, with reeds with or without air reservoirs.
Metallic wind instruments, simple, with lengthening pieces, with slides, with piston, with keys, with reeds, etc.

CLASS 15.—*Mathematical and philosophical instruments.*

Apparatus and instruments used for mathematical purposes.
Apparatus and instruments illustrating practical geometry, land-surveying, topography, and geodesy; compasses, calculating machines, levels, mariners' compasses.
Apparatus and instruments for measurement; verniers, micrometric screws, dividing machines, etc.; scales for scientific uses.
Optical instruments. Astronomical instruments. Physical and meteorological instruments, microscopes, etc. Instruments and apparatus requisite for laboratories and observatories.
Weights and measures of various countries, etc.

CLASS 16.—*Maps, geographical and cosmographical apparatus.*

Topographical, geographical, geological, hydrographical, astronomical, and photographic maps, atlases, etc.
Physical maps of every kind. Plans in relief.
Terrestrial and celestial globes and spheres. Statistical works and tables. Tables and ephemerides for the use of astronomers and sailors, etc.

THIRD GROUP.—FURNITURE.

CLASS 17.—*Furniture and accessories.*

Sideboards, book-cases, tables, dressing-tables, beds, sofas, couches, billiard-tables, bagatelle, etc.
Mirrors, looking-glasses.

CLASS 18.—*Upholsterers' and decorators' work.*

Bed furniture, stuffed and cane chairs, canopies, curtains, tapestry, and other hangings.
Decorative furniture, made of costly stones and substances. Carton-pierre, papier-maché. Frames. Gilded and plain decorations for churches and houses. Window blinds of wood. Small articles of fancy furniture, etc.

CLASS 19.—*Carpets, tapestry, and other stuffs for furniture.*

Carpets and rugs, moquettes, tapestry, terry and velvet pile, etc. Felt carpets, matting, India-rubber floor-cloth, painted or printed blinds.

Furniture stuffs of cotton, wool, or silk, plain or figured. Horse-hair fabrics and leather cloths, moleskins, etc. Leather for hangings, for covering furniture. Upholsterers' and carriage trimmings. Oilcloths. Linoleum, etc.

CLASS 20.—*Paper-hangings.*

Printed paper-hangings. Flock, marbled, veined paper, etc. Artistic papers. Varnished and enameled paper. Imitations of wood and of leather.

CLASS 21.—*Cutlery and edge tools (except surgical instruments).*

Knives, all kinds. Scissors, razors. Cutlery of every description. Machine edge tools, circular saws.

CLASS 22.—*Hardware, ironmongery, and metallic products.*

Iron safes. Nails, wrought and cut. Wires, all kinds. Wire ropes, wire-work and wire gauze. Chains, screws.

Ornamental castings. Tinned and enameled hollow-ware.

Brass and iron ware for household purposes.

Locks. Lacquered ware. Needles, pins.

Sheet-iron, galvanized iron. Tin plates.

Copperware, etc.

CLASS 23.—*Jewelry, goldsmiths' and silversmiths' work, precious stones.*

Jewelry in precious metals (gold, platinum, silver, aluminium), chased, filigreed, set with precious stones, etc.

Plated and imitation jewelry.

Ornaments in jet, amber, coral, mother-of-pearl, steel, etc.

Diamonds, precious stones, pearls, and imitations.

Coins and medals.

Church plate, ornamental plate, and table plate, gold and silver toilet articles, writing materials, etc.

Enamels, cloisonné, champlevé.

CLASS 24.—*Electro-plated ware.*

Electro-plated ware.

CLASS 25.—*Clocks and watches.*

Separate parts of clocks of large or small size.

Watches, chronometers, pedometers; various time-keepers, etc. Time-pieces and clocks working by springs or weights, regulators, metronomes.

Astronomical clocks; marine chronometers; traveling clocks. Alarms, etc. Water clocks and sand glasses. Electric clocks. Turret and church clocks.

CLASS 26.—*Perfumery and toilet soaps.*

Essence of extracts from flowers, by enfleurage, maceration, or absorption.

Bouquet essences for the handkerchief.

Aromatic vinegar, violet, and other perfumed powders, scent-bags, pot-pourri, cosmetics, perfumed oils, etc.

Toilet soaps, all kinds.

CLASS 27.—*Fancy leatherwork, and fancy articles in leather and wood of every description.*

Dressing-cases, work-boxes, small articles of fancy furniture, liquor-cases, glove-boxes, caskets. Cases and bags, jewel-boxes. Purses, pocket-books, note-books, cigar-cases.

Turned, engine turned, carved or engraved articles in wood, ivory, tortoise shell, etc. Snuff-boxes. Pipes.

Fancy basket work; wicker work for bottles; articles in fine straw.

FOURTH GROUP.—FICTILE MANUFACTURES; GLASS, POTTERY, ETC.

CLASS 28.—*Crystal, glass, and colored glass, for table use.*

Drinking glasses of crystal, cut glass, plated and mounted crystal, etc. Table glass, common glass bottles.

Window and mirror glass. Cast, enameled, crackled, frosted, and tempered glass.

Glass crystals, for optical purposes, ornamental glass, etc.

Colored glasses, fairy lamps, etc.

Venetian glass.

CLASS 29.—*Pottery, china, and delph.*

Biscuit ware, hard and soft paste porcelain. Tea and dinner services, etc.

Fine earthenware with colored glazing, etc. Earthenware biscuit. Terra cotta. Enameled lava. Bricks and tiles. Stoneware.

Composition ornaments and objects moulded in plaster, not belonging to the fine arts.

FIFTH GROUP.—TEXTILE FABRICS, CLOTHING AND ACCESSORIES.

CLASS 30.—*Cotton thread and fabrics.*

Cotton, dressed and spun.

Pure cotton fabrics, plain and figured.

Mixed cotton fabrics.

Cotton velvet.

Cotton ribands and tapes, etc.

CLASS 31.—*Thread and fabrics of flax, hemp, jute, etc.*

Flax, hemp, jute, and other vegetable fibers spun.

Linen and drills. Cambric. Linen fabrics mixed with cotton or silk.

Fabrics made from vegetable fibers as substitutes for flax and hemp.

CLASS 32.—*Worsted yarn and fabrics.*

Carded wool, worsted yarn.

Muslins de laine, Scotch cashmere, merinos, serges, etc.

Ribands and laces of wool, mixed with cotton or thread, silk, or floss silk. Hair tissues, pure or mixed.

CLASS 33.—*Woolen yarn and fabrics.*

Combed wool and woolen yarn.

Cloth and other woolen fabrics.

Blankets. Felt of wool or hair for carpets, hats.

Woolen fabrics, unmilled or slightly milled; flannel, tartans, swansdown, etc.

CLASS 34.—*Silk and silk fabrics.*

Raw and thrown silk. Silk cocoons. Floss silk, yarn. Lace made of silk, and trimmings of silk.

Silk fabrics, pure, plain, figured, brocaded. Silk fabrics mixed with gold, silver, cotton, wool, thread.
Manufactures of floss silk, pure or mixed.
Velvet and plush.
Silk ribands, pure or mixed. Silk shawls.

CLASS 35.—*Shawls.*

Shawls other than silk.
Woolen shawls, pure or mixed.
Cashmere shawls, etc.

CLASS 36.—*Lace, net, embroidery, and trimmings.*

Thread or cotton lace made with the distaff, the needle, or the loom.
Lace.
Gold and silver lace.
Silk or cotton net, plain or figured.
Tambour embroidery, crochet-work, etc. Gold, silver, and silk embroidery. Church embroidery. Embroidery, tapestry, and other work done by the hand.
Worsted, mohair, horse-hair, thread and cotton laces.
Lace-work and trimmings, real or imitation; lace-work for military uniforms.

CLASS 37.—*Hosiery and accessories of clothing.*

Hosiery of cotton, thread, wool, cashmere, silk, or floss silk, pure or mixed. Elastic fabrics. Flannel and other woolen garments.
Scarfs, gloves, gaiters, braces, screens, umbrellas, parasols, etc.

CLASS 38.—*Clothing for men.*

Men's clothes. Waterproof clothing. Underclothing.
Men's hats.
Clothing peculiar to the various military and other professions and trades, native costumes of various countries.

CLASS 39.—*Millinery, dress, fancy needlework, and toys.*

Dresses of all kinds, underclothing, head dresses, artificial flowers and feathers, ladies' cloaks and mantles, stays, and children's clothes, and all kinds of fancy needlework.
Dolls and playthings, dolls and figures in wax.
Toys and games for the amusement of children.

CLASS 40.—*Boots and shoes.*

Bespoke boots and shoes, all kinds.
Machine-made boots and shoes, all kinds.
Boot lasts, boot trees, etc.

CLASS 41.—*Wigs and works in hair.*

Judges, councilors, barristers, livery servants' and ordinary wigs, watch guards, etc.

CLASS 42.—*Fire-arms, ordnance, and other instruments and apparatus for the destruction of life, for hunting, trapping, fishing, and military engineering.*

Defensive armor: cannons, mortars, gatling guns, torpedoes.
Fire-arms: guns and rifles, pistols and revolvers, etc.
Side arms: swords, sabers, bayonets, lances, foils, axes, hunting knives.

Missile weapons: bows, crossbows, slings, blunt weapons, maces, life preservers, etc.

Accessory objects appertaining to every kind of small arms: powder flasks, bullet moulds, etc.

Round, oblong, hollow, and explosive projectiles. Percussion caps, priming, cartridges.

Hunting and sporting equipments.

Traps and snares: fishing lines and hooks, harpoons, nets, bait, and fishing apparatus.

CLASS 43.—*Traveling apparatus and camp equipage.*

Valises, saddle-bags, etc. Dressing-cases and traveling cases. Traveling-rugs, cushions, caps, traveling costumes and boots, iron-shod sticks, grapnel-hooks, sunshades, etc.

Portable apparatus specially intended for scientific voyages and expeditions; traveling photographic apparatus; equipments and implements for geologists, mineralogists, naturalists, colonists, pioneers, etc.

Tents and camp equipage. Beds, hammocks, folding chairs, etc.

CLASS 44.—*Cricket materials and other outdoor games.*

Cricket bats and balls, wickets, etc.

Footballs, tennis balls, and racquets.

Gymnastic appliances: instructive games, etc.

SIXTH GROUP.—ALIMENTARY, RAW, AND MANUFACTURED PRODUCTS.

CLASS 45.—*Timber and products of forests, indigenous and non-indigenous.*

Specimens of different kinds of forest timbers.

Woods for cabinetwork, railway sleepers, wharf purposes, and for ship and house building; palings, shingles, and bark, for textile and building purposes; staves for wine and ordinary casks; corkwood, charcoal. Bent woods, turnery, etc.

CLASS 46.—*Vegetable products of land and sea obtained without culture.*

Mushrooms, truffles, wild fruits, lichens, mosses, seaweeds, sponges, coral fungoids, rushes, fibrous grasses, India-rubber, gutta-percha, and analogous articles.

CLASS 47.—*Cultivated vegetable products of the soil not used for food.*

Raw cotton, flax, hemp, jute, esparto, and all other vegetable fibers; tobacco, unmanufactured, for sheepwash, etc.; cane, willows, osiers, and basket-work, etc.

CLASS 48.—*Cultivated vegetable products used for food other than cereals and flour.*

Arrowroot, rice, tapioca, sago, macaroni, vermicelli, and other alimentary preparations; infants' foods, etc.; preserved vegetables and fruits; food products for animals, ensilage, and other preserved fodders and food substances specially intended for feeding cattle.

CLASS 49.—*Farm and dairy products.*

Milk, cream, butter, cheese, eggs, honey, beeswax, apiarian exhibits, and preserved milk, etc.

CLASS 50.—*Meats and fish.*

Salt meat, preserved meats, rabbits, etc., and fish of all kinds; preserved soups, etc.

CLASS 51.—*Wheat, oats, barley, and other agricultural products (not otherwise enumerated).*

Cereals, wheat, oats, barley, rye, maize, etc. Leguminous: beans, peas, for cattle; tares, canary seed, etc. Manures, organic or mineral.

CLASS 52.—*Garden and orchard products.*

Fresh vegetables: cabbages, potatoes, carrots, mangolds, turnips, beet-root, peas, onions, garlic, cucumber, gourds, pumpkins, melons, salads, etc.

Apples, pears, oranges, lemons, quinces, plums, cherries, passion fruit, etc.

CLASS 53.—*Flour, bread, pastry, and confectionery.*

Flour and meals.

Various kinds of bread, with or without yeast; fancy bread and bread in shapes; biscuits, all kinds, compressed bread for traveling, military campaigns, etc.

Pastry of various kinds peculiar to each country. Gingerbread and dried cakes capable of being preserved.

Confectionery.

Sugar plums, bon bons, nougats, angelica, aniseed, etc.

Preserves, jellies, jams, sirups.

Sugar candy.

CLASS 54.—*Chemicals and chemical products.*

Acids, alkalies, chemical salts, sea salt, and products obtained from mother water, essential oils, gasoline, kerosene, tar, and the dye products derived from it. Household soaps and candles. Various products of chemistry, and specimens of bleached or dried fabrics, disinfectants.

CLASS 55.—*Pharmaceutical products, spices, condiments, and dye materials.*

Odoriferous and resinous substances, gums, Peruvian and other medicinal barks, drugs of every kind, dyes and colors (other than products of coal tar), logwood, sumac, and other dye substances, blacking, inks, paints, fatty oils, varnishes, and various coating substances, mineral waters, natural and artificial, aerated waters, appliances made of India-rubber and gutta percha, gold-beater's skin, dried medicinal plants.

Spices, peppers, cinnamon, table salt, vinegar, mustard, sauces, etc.

CLASS 56.—*Brushware and brush materials.*

Brushes and combs, hair, bristles, undressed feathers, down, horn, glue, mother of pearl.

CLASS 57.—*Wool.*

Merino wool washed, Merino wool greasy, long wool washed, scoured wool, Angora hair or mohair, sheep-dip, etc.

CLASS 58.—*Tobacco and cigars.*

Tobacco in leaves or manufactured, cigars all kinds, cigarettes all kinds, tobacconists' wares, including meerschaum and other pipes, cigar-holders, etc.

CLASS 59.—*Leather and skins.*

Raw hides, salted hides. Tanned, curried, dressed, or dyed leather. Varnished leather.

Morocco and sheepskin; skins grained, shamoyed, tawed, dressed, or dyed.

Prepared skins for glove-making. Skins and furs, dressed and dyed. Parchment.

Gutwork: sinews.

Raw materials used in the dressing of skins and leather. Wattle bark, oak, and other tan barks.

SEVENTH GROUP.—MACHINERY—APPARATUS AND PROCESSES USED IN THE MECHANICAL INDUSTRIES.

CLASS 60.—*Agricultural implements used in the cultivation of fields and forests.*

Apparatus and works for agricultural engineering, draining, etc. Plans and models of farm buildings.

Tools, implements, machines, and apparatus used in husbandry, sowing and planting, harvesting, preparation and preservation of crops.

Various agricultural machines worked by horse-power or by steam.

Locomotives, engines, and horse-powers for the farm.

Apparatus used in the cultivation of forests and in the trades appertaining thereto.

Apparatus used in the manufacturing of tobacco.

CLASS 61.—*Apparatus used in agricultural works and in works for the preparation of food, irrigation of land, and in the manufacture of artificial manures.*

Apparatus used in agricultural works: Manufacture of artificial manures; of drain pipes; cheese factories, dairies; apparatus used in preparing flour, fecula, starches, oils; apparatus used in breweries, distilleries, sugar manufactories, and refineries; silk-worm nurseries, etc.

Apparatus used in the preparation of alimentary products, mechanical appliances for kneading and baking; apparatus used in making pastry and confectionery.

Apparatus for the manufacture of vermicelli, macaroni, etc. Machines for making sea biscuits. Chocolate machines. Apparatus for roasting coffee.

Apparatus for making ices and cool drinks; manufacture and preservation of ice.

CLASS 62.—*Implements, models, and plans connected with irrigation of land.*

Centrifugal, steam, and other pumps; water wheels, windmills, sluice gates, etc. Plans, models, etc.

Boring apparatus for artesian wells and wells of large diameter.

CLASS 63.—*Apparatus used in chemistry and pharmacy.*

Laboratory utensils and apparatus.

Apparatus and instruments used in assays for industrial and commercial purposes.

Apparatus used in the manufacture of chemicals, soaps, and candles.

Apparatus used in the manufacture of essences, varnishes, and articles made of India-rubber and gutta-percha.

Processes and apparatus used in gasworks.

Processes and apparatus used in bleaching.

Apparatus used in the preparation of pharmaceutical products.

CLASS 64.—*Machines and apparatus in general.*

Separate pieces of machinery; bearings, rollers, slide-bars, eccentrics, toothed wheels, connecting rods, cranks, parallel joints, belts, funicular apparatus, etc. Gearing, spring and catchwork, etc. Regulators and governors.

Lubricators.

Machines for counting and registering. Dynamometers, steam gauges, weighing machines. Gauges for liquids and gas.

Machines used for moving heavy weights.

Hydraulic machines for raising water, etc.; norias (chain pumps), scoop wheels, hydraulic rams.

Fire engines and apparatus used in the extinction of fires and saving of life thereat.

Hydraulic engines, water wheels, turbines, hydraulic lifts, etc.

Accumulators and hydraulic presses.

Steam engines. Boilers, steam generators, and apparatus appertaining thereto.

Apparatus for condensing steam.

Machines set in motion by the evaporation of ether, chloroform, ammonia, or by a combination of gases.

Machines set in motion by gas, hot air, and compressed air.

Windmills and panemones. Air-balloons.

CLASS 65.—*Machine tools.*

Traveling circular-saw benches, self-acting, for breaking down heavy timber. Machines for boring timber used in fencing.

Engines and tools for preparing wood for the workshop. Machines for making casks.

Machines for cutting cork. Lathes, boring and planing machines. Slotting, drilling, and shaping machines. Screw-cutting engines and riveting machines. Various kinds of tools used in machine workshops. Bellows, etc.

Tools, engines, and apparatus for pressing, crushing, working up, sawing, polishing, etc. Special tools and engines used in various trades.

CLASS 66.—*Apparatus used in spinning and rope-making.*

Hand-spinning apparatus. Separate parts of spinning apparatus. Machines and apparatus used in the dressing and spinning of textile materials. Apparatus and processes for the subsidiary operations appertaining thereto; for drawing, winding, twisting, throwing, dressing. Apparatus for separating the qualities and numbering the thread.

Machinery used in rope manufacture, round, flat, tapering cables, cord and twine, wire-ropes, cables with wire core, rope matches, quick-matches, etc.

CLASS 67.—*Apparatus used in weaving.*

Apparatus used in the preparation of materials for weaving: warping mills, spooling (winding) machines. Card-making for the jacquard looms.

Hand looms and mechanical looms for the manufacture of plain fabrics. Looms for the manufacture of figured and brocaded stuffs: damask looms, electric looms.

Looms for the manufacture of carpets and tapestry.

Mesh weaving looms for the manufacture of hosiery and net. Apparatus for making lace. Apparatus used in the manufacture of lace-work.

High warp looms and different modes of preparing the bobbins for weaving. Accessory apparatus: machines for fulling, calendering, figuring, watering, measuring, folding, etc.

CLASS 68.—*Sewing and other machines for making up clothing, laundries, etc.*

Ordinary implements used by tailors and seamstresses. Sewing, quilting, hemming, and embroidering and knitting machines.

Implements for cutting out materials and leather for making garments and shoes.

Machines for making, nailing, and screwing boots and shoes.

Machines for the application of India-rubber.

Machines for wringing, mangling, washing, etc.

CLASS 69.—*Machinery used in the manufacture of furniture.*

Machines for cutting veneers. Turning webs, vertical and circular saw frames, shingle cutters, etc.

Machines for cutting the mouldings and beadings of frames; the squares of inlaid floors, furniture, etc. Lathes and other apparatus used in carpentering and cabinet-making.

Machines for stamping and burnishing. Machines and apparatus for working stucco, papier-maché, ivory, bone, and horn.

Machines for pointing, carving, and reducing statues; for engraving, engine-turning, etc.

Machines for making bricks and tiles; machines for making artificial stones.

Machines for sawing and polishing hard stones, marbles, etc.

CLASS 70.—*Machines and instruments used in coining, etc.*

Coining presses.

Machines for making buttons, pens, pins, envelopes; packing-machines, brush-making machines, machines for making cards, capsules; for affixing lead seals to merchandise; for corking bottles, etc.

Tools for, and processes of, making clocks, toys, marqueterie, baskets, etc.

Machines for binding books. Writing machines.

CLASS 71.—*Carriages, coachmakers' and wheelwrights' work.*

Separate parts of wheels and carriages; wheels, tires, axles, axle-boxes, ironwork, etc. Springs and various methods of hanging carriages.

Different systems of harnessing. Breaks.

Coachmakers' and wheelwrights' work. Wagons, tumbrels, drays, and other vehicles for special purposes.

Carriages; public, state, and private carriages; sedan chairs, litters, sledges, etc., velocipedes, bicycles, and tricycles.

CLASS 72.—*Harness and saddlery.*

Various articles used for carriage horses and saddle horses; pack-saddles, saddles, bridles, and harness for saddle horses, beasts of burden, and draught horses; stirrups, spurs, whips, etc.

Traveling and other leather trunks.

CLASS 73.—*Railway rolling stock and appliances.*

Separate parts: springs, buffers, breaks.

Permanent way: rails, chairs, crossings, switches, fish-plates, turn-tables; buffers, feeding cranes, and tanks; optical and acoustic signals.

Permanent way for tramways.

Rolling stock: passenger carriages; wagons for carrying earth, goods, cattle; locomotives, tenders, etc.

Self-moving carriages; locomotives, for roads.

Special tools and machines for the maintenance, repair, and construction of railways.

Apparatus for inclined planes; apparatus and engines for atmospheric railways; models of engines, of systems of traction, of apparatus appertaining to railways.

Models, plans, and drawings of platforms, stations, and engine-houses, and other buildings necessary for the working of railways.

Plans and models of machines and appliances for the economic receiving and delivering of grain.

CLASS 74.—*Electric, pneumatic, and other apparatus.*

Appliances for telegraphs based on the transmission of light, sound, etc.

Apparatus for the electric telegraph, post, wires, stretchers, etc.

Batteries and apparatus for sending and receiving messages.

Bells and electric signals.

Telegraphs for military purposes. Objects appertaining to telegraphy; lightning conductors, communicators, prepared paper for printing messages and for sending autographic messages.

Special apparatus for pneumatic telegraphy, electro-magnetic machines.

Phonographs, microphones. Appliances for generation and storage of electricity, etc.

CLASS 75.—*Apparatus and materials of civil engineering, public works, and architecture.*

Building materials: stone, wood, metals; ornamental stone; lime, mortar, cements artificial stone and concrete; asphalt; roofing tiles, bricks, paving tiles; slates, pasteboard and felt for roofing.

Apparatus and products of processes used in the preservation of wood. Apparatus and instruments for testing building materials.

Apparatus for earthworks, excavators. Apparatus used in building yards. Tools and processes used by stone dressers and cutters, masons, carpenters, tilers, blacksmiths, joiners glaziers, plumbers, house painters, etc.

Railings, balconies, banisters, etc.

Apparatus and engines used in making foundations: pile-drivers and pile work, screw piles, pumps, pneumatic apparatus, dredging machines, etc. Apparatus used in hydraulic works connected with harbors, canals, rivers; machines used in reducing stones, quartz, or other hard substances.

Apparatus used in the supply of water and of gas. Apparatus used in the maintenance of roads plantations and public walks.

Models, plans, and drawings of public works; bridges, viaducts, aqueducts, drains, canal bridges, dams, weirs, etc.

Light-houses. Public buildings for special purposes; buildings for civil purposes; mansions and houses for letting; workmen's towns, industrial dwellings, etc.

CLASS 76.—*Navigation, boat and ship building, and life-saving.*

Drawings and models of slips, graving docks, floating docks, etc.

Drawings and models of vessels of all kinds, sea-going and for rivers. Models of the systems of ship-building adopted in the navy.

Pleasure boats, yachts, etc.

Boats and barges.

Materials for the rigging of ships.

Flags and signals. Apparatus for the prevention of collisions at sea. Buoys, beacons, etc.

Apparatus for swimming, diving, and life-saving exhibited in action; floats, swimming belts, etc. Diving belts, cork jackets, nautilus life belts, etc. Submarine boats; apparatus for saving life at sea, rocket apparatus, life-boats, etc.

CLASS 77.—*Materials and apparatus for military purposes.*

Military engineering and fortifications.

Military equipment, clothing, and encampments.

Military transport service.

Military topography and geography.

EIGHTH GROUP.—DRINKS AND STIMULANTS.

CLASS 78.—*Tea, coffee, etc.*

Tea, coffee, and other aromatic beverages, chicory and sweet acorn coffee.

Chocolate, cocoa.

Sugar for household purposes.

CLASS 79.—*Wines—Natural wines and spirits.*

Light wines up to 22 per cent., in bottle or bulk.

Medium light wines up to 26 per pent., in bottle or bulk.

Full-bodied wines over 26 per cent., in bottle or bulk.
Champagne, dry and sweet.
Brandy, whisky, rum, gin, and liqueurs, spirits of wine.

CLASS 80.—*Beers.*

Ale, porter, and lager beer, in bottle or bulk.
Cider, perry, and other beverages made from fruits.
Fermented drinks made from vegetable sap, from milk, and sweet substances of all kinds.
Malt and hops, etc.

NINTH GROUP.—SANITATION, MEDICINE, HYGIENE, AND PUBLIC RELIEF.

CLASS 81.—*Surgical instruments and appliances.*

Appliances, instruments, and apparatus requisite for anatomical and histological works.
Plastic anatomical models.
Instruments of medical research.
Apparatus and instruments for dressing wounds and for simple surgery, general and local; anæsthetic apparatus.
Surgical instruments grouped according to their purposes: instruments for amputations and dissection. Special instruments, obstetrics, ovariotomy, urinary channels, ophthalmology, dentistry, etc.; electro-therapeutic apparatus.
Apparatus for plastic and mechanical prosthesis, orthopedic apparatus.
Trusses.
Chests and cases of instruments and medicines for military and naval surgeons. Means and apparatus for succoring the wounded on battle-fields. Civil and military ambulances.
Appliances, instruments, apparatus, and all things requisite for veterinary surgery.
Antiseptic surgery.

CLASS 82.—*Sanitation, hygiene, and public relief.*

Apparatus for restoring persons apparently drowned or suffocated.
Baths and hydro-therapeutic apparatus; gymnastical apparatus for medical and hygienic purposes.
Plans and models of hospitals, various asylums, houses of refuge, poor-houses, lunatic asylums. Arrangements and furniture of such establishments. Plans and models of a healthy and an unhealthy house. Various apparatus for infirm persons, invalids, and lunatics. Accessory objects for the medical, surgical, and pharmaceutical services in hospitals or infirmaries.
Appliances, instruments, apparatus, and all things relating to sanitary matters.

CLASS 83.—*Apparatus for heating and lighting.*

Fire-grates, fire-places, stoves, and hot-air stoves. Accessory objects for heating. Kitchen ranges and apparatus for heating and cooking by gas.
Apparatus for heating by the circulation of hot water, steam, or heated air. Ventilating apparatus. Drying apparatus; drying stoves.
Enameler's lamps, blow-pipes, portable forges.
Lamps for illuminating purposes, fed with various oils.
Accessory objects for lighting. Matches.
Apparatus and accessory objects for lighting by gas.
Lamps for the electric light. Apparatus for the use of the electric and magnesium light.

TENTH GROUP.—AGRICULTURAL AND ASSOCIATED INDUSTRIES.

CLASS 84.—*Specimens of farm buildings and agricultural works.*

Examples of the farm buildings of various countries.

Examples of stables, cattle-sheds, sheep-folds, pig-sties, and of premises for rearing and fattening such animals. Apparatus for artificial hatching and appliances for the rearing of poultry.

ELEVENTH GROUP.—HORTICULTURE.

CLASS 85.—*Conservatories and horticultural apparatus.*

Apparatus for watering and keeping turf in order, etc.

Large conservatories and apparatus appertaining thereto. Room and window conservatories.

Aquariums for aquatic plants.

Fountains and other plants for ornamenting gardens.

CLASS 86.—*Flowers and ornamental plants.*

Varieties of plants and examples of culture exhibiting the characteristic types of the flower gardens and dwellings of each country.

CLASS 87.—*Vegetables.*

Varieties of plants and examples of culture exhibiting the characteristic types of the kitchen gardens of each country.

CLASS 88.—*Fruit and fruit trees.*

Varieties of plants and specimens of products exhibiting the characteristic types of the orchards of each country.

CLASS 89.—*Seeds and saplings of forest trees.*

Varieties of plants and specimens of products illustrating the processes followed in each country for planting forests.

CLASS 90.—*Plants for conservatories.*

Illustrations of the mode of culture adopted in various countries, with a view either to ornamentation or to utility.

TWELFTH GROUP.—MINING INDUSTRIES—MACHINERY AND PRODUCTS.

CLASS 91.—*Apparatus used in the art of mining and metallurgy.*

Boring machines and apparatus for breaking down coal and cutting rocks. Apparatus for blasting by electricity.

Models, plans, and views of the mode of working in mines and quarries. Works for obtaining mineral waters. Machines and apparatus used for extracting ore and for lowering and hoisting miners.

Winding, pumping, and crushing machinery.

Safety cages and hooks; signals and other appliances for lessening the danger in mines.

Machines for draining; pumps.

Ventilating apparatus; ventilators.

Safety lamps; lamps for electric light.

Apparatus for the mechanical dressing of ores and mineral fuel.

Apparatus for compressing fuel into cakes.

Apparatus for the carbonization of fuel. Smelting furnaces. Smoke-consuming apparatus.

Apparatus used in metal works and stone-breaking.

Special apparatus used in forges and foundries, electro-metallurgical apparatus.

Apparatus used in metal manufactures of all kinds.

Drawings of different classes of machinery used in mining.

CLASS 92.—*Metals and ores.*

Collections and specimens of rocks, minerals, ores. Ornamental stones. Hard stones. Refractory substances. Earths and clays. Various mineral products. Raw sulphur. Rock salt; salt from salt springs.

Mineral fuel, various kinds of coal, coal dust, and compressed coal. Asphalt and rock asphalt. Bitumen. Mineral tar.

Metals in a crude state: pig-iron, iron, steel, cast-steel, copper, lead, gold, silver, zinc, antimony, etc. Alloys.

Products of washing and refining precious metals, of gold-beating, etc.

Products of the working of metals: rough castings, bells, wrought-iron, iron for special purposes, iron plates for casing ships and constructions, etc.

Manufactured metals: unwelded pipes.

Other metal manufactures.

JOSEPH BOSISTO,
Chairman of Juries.

R. S. SUGARS,
Secretary Jury Department.

OFFICIAL CATALOGUE OF EXHIBITS FROM THE UNITED STATES.

GROUP I.—WORKS OF ART.

CLASS 2.—*Various Paintings, Drawings, etc.*

1. PRANG, L., & CO., Boston, Mass.—Pictures, etc.
2. ROOKWOOD POTTERY CO., Cincinnati, Ohio.—Fine art pottery and chinaware.
3. WALKER, J., San Francisco, Cal.—"Relieving Guard at Horse Guards, Whitehall, London."

CLASS 5.—*Engravings and Lithographs.*

4. CURRIER & IVES, New York.—Lithographic printing.
5. JENKS, MRS. M. A.—Decorative and oil paintings on velvet.
6. LOWELL, J., & CO., Boston, Mass.—Printings from steel.
7. WELLS, HOPE & CO., Philadelphia.—Enameled advertising signs.

GROUP II.—EDUCATION AND INSTRUCTION—APPARATUS AND PROCESSES OF THE LIBERAL ARTS.

CLASS 6.—*Education of Children, Primary Instruction of Adults.*

8. STATE OF MICHIGAN EDUCATIONAL SYSTEM.—Educational system.

GROUP II—Continued.

CLASS 8.—*Organization, Methods, and Appliances for Superior Instruction.*

9. EDUCATIONAL SYSTEM UNITED STATES NAVAL ACADEMY, Annapolis, Md.—Educational system.

CLASS 9.—*Printing, Books.*

10. "AMERICAN MAIL," printed by Lockwood Press, New York.—Publication, "American Mail."
11. HEALTH PUBLISHING COMPANY, Battle Creek, Mich.—Anatomical, physiological, and hygienic charts; books on rational medicine, etc.
12. INTERNATIONAL TRACT AND MISSIONARY SOCIETY, Battle Creek, Mich.—Bibles, tracts, periodicals, etc.
13. THE PUBLISHERS OF THE "AMERICAN ART PRINTER," New York.—Collection of fine printing.
14. THE INTERSTATE PUBLISHING CO., Chicago.—Educational Publications.

CLASS 10.—*Stationery, Book-binding, Painting and Drawing Materials.*

15. BARNES, A. S., New York.—Writing and copying inks, pens, etc.

GROUP II—Continued.

CLASS 10.—*Stationery, Book-binding, Printing and Drawing Materials*—Continued.

16. CALIFORNIA PAPER CO., San Francisco.—Newspaper and Manila paper. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
17. DON, W., New York.—Fretwork and wood for artistic purposes.
18. HAUFFMAN & STRAUSS, New York.—Advertising novelties, fine lithographic work.
19. LIVERMORE, C. W., Providence, R. I.—Stylographic pens, etc.
20. PHILADELPHIA NOVELTY CO., Philadelphia.—Novelties in stationery specialties, etc.
21. PRATT COPYING BOOK CO, New York.—Letter copying book, etc.
22. ROGERS, L. H., New York.—Tissue and tracing papers.
23. SCOTFORD MANUFACTURING CO., Greenworth st., New York.—Rubber stamps, presses, ink for rubber stamps.
24. GOVERNOR FOUNTAIN PEN CO., Brooklyn, N. Y.—Stylographic pens, etc.
25. KELLY, R. A., San Francisco, Cal.—Paints and oils.
26. MOORE, B., & Co., Brooklyn, N. Y.—Kalsomine, etc. Agent: J. C. Oakman, Sydney and New York.
27. KOSMAIN MANUFACTURING CO., New York.—Safety ink.
28. WADSWORTH, HOWLAND & CO., Cincinnati.—Coach colors, etc. Agent: J. C. Oakman, Sydney and New York.

CLASS 11.—*General Application of the Arts of Drawing and Modeling.*

29. BURN, W., New York.—Art novelties, etc.
30. THE PORTABLE COPY-PRESS AND STATIONERY CO., Michigan—Cylindrical and portable letter-copying press, etc., for office.

CLASS 12.—*Photographic Proofs and Apparatus.*

31. BURN, W., New York.—Enlarged photographs, etc.
32. MERRY, T. B., Oregon.—Photographs of dogs.
33. POPE & TALBOT, San Francisco, Cal.—Photographs of timber mills at Puget Sound, British Columbia.
34. TOUNE, B. C., Portland, Oregon.—Group of setter slut and puppies.

CLASS 13.—*Musical Instruments*

35. BRETHOVEN PIANO ORGAN CO., New Jersey.—Cabinet and orchestral organs; golden tongue reeds; cases in walnut, oak, holly, etc.
36. BEHR BROS. & CO., New York.—Pianos containing patent cylinder top, finger guard, Bessemer steel action frame, etc.
37. CARPENTER'S ANGELUS ORGAN.—Various styles of organs.
38. DYER & HUGHES, Worcester.—Cabinet organs.

GROUP II—Continued.

CLASS 13.—*Musical Instruments*—Continued.

39. FARRAND VOTEY ORGAN CO.—Organs.
40. KIMBALL, W. W., & Co., Chicago.—Organs.
41. LORING & BLAKE, Worcester, Mass.—Organs.
42. MASON & HAMLIN, New York.—Various styles of cabinet organs.
43. MILLER ORGAN CO., Lebanon.—Organs.
44. SMITH AMERICAN ORGAN CO., Boston—Cabinet organs.
45. THE ESTEY AMERICAN ORGAN CO., Vermont.—Various styles of American organs.
46. T. M. ANTISELL PIANO CO., San Francisco.—Upright Antisell grand piano, with metallic rest, which keeps the piano permanently in tune.
47. WILCOX & WHITE ORGAN CO., Meriden, Conn.—Organs.

CLASS 14.—*Mathematical and Philosophical Instruments.*

48. LIVERMORE, C. W., Providence, R. I.—Optics

GROUP III.—FURNITURE AND ACCESSORIES.

CLASS 16.—*Furniture.*

49. AMERICAN OIL STOVE CO., Gardner, Mass.—Oil stoves and accessories.
50. BISSELL CARPET SWEEPER CO., New York.—Carpet sweepers, etc. Agents: Harry Dix & Co., 65 William street, Melbourne.
51. CONANTS, F. H., & SONS, New York.—Chairs.
52. EMPIRE WRINGER CO., New York.—Wringers and towel racks.
53. HEYWOOD BROS. & CO., San Francisco, Cal.—Rattan and reed furniture.
54. JONES, R. B, Philadelphia.—Hammoquette reclining chairs; cabinet gymnasium.
55. MARWIDELL, E. H., San Francisco.—Shades (blinds).
56. MACK, L. H., & Co., New York.—Woodenware, kitchen utensils, etc.
57. NEVINS & HAVILAND, New York.—Automatic shade rollers.
58. RACINE HARDWARE CO., Racine, Wis.—Opera chairs.
59. RICHMOND CEDAR WORKS, LTD., Richmond, Va.—Cedar pails, tubs, churns.
60. STEELE, J. J., New York.—Furniture.
61. UNION INDURATED FIBER CO., New York.—Fiber ware.
62. UNION STAIR PAD CO., Boston, Mass.—Carpets, felt, stair, pads, etc.
63. INDIANAPOLIS CABINET CO., Indiana.—Desks. Agent: J. C. Oakman, Sydney and New York.

CLASS 17.—*Upholsterers' and Decorators' Work.*

64. CHAS. M. PLUM UPHOLSTERY CO., San Francisco.—Chairs upholstered in silk material, double pillow ottoman, Smyrna rug.
65. SWAN & WHITEHEAD, Fenton, N. J.—Fancy lamp-shades.

GROUP III—Continued.

CLASS 17.—*Upholsterers' and Decorators' Work*—Continued.

66. TRENTON SPRING MATTRESS CO., Trenton, N. J.—Window blinds (fancy) and wire mattresses.
67. WHITING, J. L., & SON, Boston, Mass.—Paint and varnish brushes.
68. WEMPLE, J. C., New York.—Empire shading goods, fixtures, and painted goods. Agent: J. C. Oakman, Sydney and New York.

CLASS 18.—*Carpets, Tapestry, and other Stuffs for Furniture.*

69. ATHA & HUGHES, New York.—Ducks, oil-cloths, and stair-cloths.

CLASS 20.—*Cutlery.*

70. BRONGHER, FAUK & CO., Harrisburg, Penn.—Patent skinning knives.

CLASS 21.—*Goldsmiths' and Silversmiths' Work.*

71. HORTON, ANGEL & CO., Attleboro', Mass.—Jewelry.
72. LIVERMORE, C. W., Providence, R. I.—Jewelry.
73. JOSEPH FAHY'S WATCH CASE, CO., New York.—Watch cases.

CLASS 22.—*Bronzes and various Art Castings.*

74. ANSONIA CLOCK CO., Ansonia, Conn.—Bronze figures, etc.

CLASS 23.—*Clocks and Watches.*

75. AMERICAN WALTHAM WATCH CO., Waltham, Mass.—Watches, etc.
76. AMERICAN ELGIN NATIONAL WATCH CO.—Watches.
77. ANSONIA CLOCK CO., Ansonia, Conn.—Bronze clocks, etc.
78. HORTON, ANGEL & CO., Attleboro', Mass.—Watches.
79. SETH THOMAS CLOCK CO., Thomaston, Conn.—Clocks.
80. SELF-WINDING SYNCHRONISING AND CLOCK CO. LTD., New York.—Self-winding electric motor and synchronising clocks.
81. WATERBURY WATCH CO., Waterbury, Conn.—Waterbury watches.
82. CHESHIRE WATCH CO., Cheshire, Conn.—Watches. Agent: J. C. Oakman, Sydney and New York.

CLASS 24.—*Perfumery.*

83. COLGATE & CO., New York.—Toilet soaps scents, etc.
84. LADD & COFFIN, New York.—Lundborg's perfumery.
85. WESTERN PERFUMERY CO., San Francisco, Cal.—Perfumery.

GROUP III—Continued.

CLASS 25.—*Leatherwork, Fancy Articles, and Basketwork.*

86. JOHNSON & NICHOL, Medina, N. Y.—Vulcanite fiber pails.
87. AUGANES, H., Chicago, Ill.—Carved box.
88. PACIFIC SPLINT BASKET CO., San Francisco, Cal.—Baskets.

GROUP IV.—FICTILE MANUFACTURES — GLASS, POTTERY, ETC.

CLASS 26.—*Crystal, Glass, and Stained Glass.*

89. ADAMS & CO., Pittsburgh, Penn.—Table Glassware.
90. THE THOS. EVANS CO., Pittsburgh, Penn.—Lamp chimneys, lantern globes, candy jars, and silvered reflectors.

CLASS 27.—*Pottery.*

91. CLARK, N., & SONS, San Francisco, Cal.—Flower pots.

GROUP V.—TEXTILE FABRICS, CLOTHING AND ACCESSORIES.

CLASS 29.—*Thread, and Fabrics of Flax, Hemp, Jute, etc.*

92. NERVILLE & CO., San Francisco, Cal.—Flour sacks.

CLASS 32.—*Silk and Silk Fabrics.*

93. CALIFORNIA STATE BOARD OF SILK CULTURE, San Francisco, Cal.—Exhibit of the silk industry.

CLASS 35.—*Hosiery and Underclothing, and Accessories of Clothing.*

94. BANNING, CENNIVER & CO., New York.—Haberdashery, etc.
95. LEAK GLOVE MANUFACTURING CO., Mon. Leak, San Francisco.—Leather gloves and tanned leather for making same.

CLASS 36.—*Clothing for both Sexes.*

96. THE SINGER MANUFACTURING CO., New York.—Clothing.
97. WHEELER AND WILSON MANUFACTURING CO., New York.—Clothing made by sewing machines.

CLASS 37.—*Jewelry and Precious Stones.*

98. BOURKE, R. A., New York.—Rolled gold jewelry.

CLASS 38.—*Portable Weapons, and Hunting and Shooting Equipments.*

99. MARLIN FIRE ARMS CO., New Haven, Conn.—Guns and rifles.
100. OAKMAN, J. C., New York.—Guns and rifles.
101. THE WINCHESTER REPEATING ARMS CO., New Haven, Conn.—Rifles, etc.

GROUP V—Continued.

CLASS 39. — *Traveling Apparatus and Camp Equipage.*

102. CORTLAND WAGON CO.—Buggies, etc.
103. SIMON, E., & BROS., Newark, N. J.—Trunks, etc.
104. TOLEDO COT & WRINGER CO., Toledo, Ohio.—Folding chairs, cots and beds. Agent: J. C. Oakman, Sydney and New York.
105. MERCANTILE MANUFACTURING CO., Cleveland, Ohio.—Adjustable chains.

CLASS 40.—*Toys.*

106. BRACKER & EVANS, Cincinnati.—Roller skates.
107. GENDRON IRON WHEEL CO., Toledo, Ohio.—Perambulators, etc.
108. OAKMAN, J. C., 193 Greenworth street, New York.—Roller skates and wheels.
109. SHEPARD HARDWARE CO., Buffalo, N. Y.—Mechanical toy banks, etc.
110. DOWDS, D. L., New York.—Home gymnasium.

CLASS 41.—*Products of the Cultivation of Forests and of the Trades appertaining thereto.*

111. POPE & TALBOT, San Francisco, Cal.—Samples of wood.
112. SMITH & YOUNG, San Francisco, Cal.—Building supplies.
113. MOORE, J. J., & CO., San Francisco, Cal.—Wooden doors.

GROUP VI. — RAW AND MANUFACTURED PRODUCTS AND PRODUCTS.

CLASS 42.—*Products of Hunting, Shooting, Fishing, and Spontaneous Products. Machines and Instruments connected therewith.*

114. [illegible]
115. [illegible]
116. [illegible]

CLASS 43.—*Agricultural Products not used for Food.*

117. [illegible]
118. [illegible]
119. [illegible]
120. [illegible]
121. [illegible]
122. [illegible]
123. [illegible]
124. [illegible]

GROUP VI—Continued.

CLASS 43.—*Agricultural Products not used for Food*—Continued.

125. TAYLOR BROS. & CO., Winston, [illegible] bacco.
126. WILLIAMS, T. C., & CO., Richmond, [illegible] and manufactured tobacco.
127. BEALL, C. H., Bethany, W. Va.—[illegible]
128. IMJERS BROS. & CO., Richmond, [illegible] factured tobacco and leaf-tobacco.

CLASS 44.—*Chemical and Pharmaceutical Products.*

129. AYER, J. C., & CO., Lowell, Mass. [illegible] medicines.
130. BORNE, SCRYMSER & CO., New York [illegible] eral and lubricating oils.
131. CALIFORNIA GLUE WORKS, San Francisco [illegible] Glue.
132. CHENEY, G. S., & CO., Boston, Mass. [illegible] cinal herbs, roots, barks, and flowers.
133. ELLWOOD COOPER, Santa Barbara [illegible]
134. FISCH, L. J., New York.—Pharmaceutical preparations.
135. HOP BITTERS MANUFACTURING CO. [illegible] N. Y.—Hop bitters.
136. ISLEY, DOUGHERTY & CO., New York [illegible] axle-grease, etc.
137. JOHNSTON, H. M., New York.—[illegible]
138. MASURY, J. W., & CO., New York.—[illegible] and general paints.
139. MATCHLESS METAL POLISH CO. [illegible] metal polish.
140. KRUGER, F., & CO., San Francisco [illegible]
141. [illegible]
142. [illegible]
143. [illegible]
144. [illegible]
145. [illegible]
146. [illegible]
147. [illegible]
148. [illegible]

CLASS 45.—*Chemical Processes for Bleaching, Dyeing, Printing, Dressing.*

149. [illegible] dressing for leather.

CLASS 46.—[illegible]

150. [illegible]
151. [illegible]

GROUP VI—Continued.

CLASS 46.—*Leather and Skins*—Continued.

152. KEON, A. R., & Co., Santa Cruz, Cal.—Leather and belting.
153. WARD, E. S., & Co., Newark, N. J.—Leather for carriage and harness use. Agent: J. C. Oakman, Sydney and New York.
154. BLOOM, S., San Francisco, Cal.—Leather and skins.
155. COOK, A. O., & SON, San Francisco, Cal.—Leather belting.

GROUP VII.—MACHINERY—APPARATUS AND PROCESSES USED IN THE MECHANICAL INDUSTRIES.

CLASS 47.—*Agricultural Implements used in the Cultivation of Fields and Forests.*

156. ALLEN, L., Philadelphia, Pa.—Hand seed sowers.
157. AUBURN MANUFACTURING CO., New York.—Agricultural implements.
158. AULTMAN, MILLER & CO., Akron, Ohio.—Buckeye mowers, etc.
159. BAKER & HAMILTON BENICIA AGRICULTURAL WORKS, 88 Wall street, New York.—Plow.
160. BICKFORD & HUFFMAN, Macedon, N. Y.—Grain drill.
161. BLAIR MANUFACTURING CO., Springfield, Mass.—Lawn-mowing machines.
162. BRADLEY D., MANUFACTURING CO., Chicago.—Plows, etc.
163. DEERING REAPER & BINDER MOWING MACHINE CO.—Harvesting machinery.
164. DERBY & BALL, Bellows Falls, Vt.—Wood ware, scythe handles.
165. DILLM & MCGUIRE MANUFACTURING CO., Richmond, Ind.—Lawn mowers.
166. DUNN EDGE TOOL CO., Oakland, Me.—Hay knives, etc.
167. ECONOMIST PLOW CO., South Bend, Ind.—Plows and attachments.
168. FRAZER LUBRICATOR CO., New York.—Fraser axle-grease.
169. FREEMAN S., & SONS' MANUFACTURING CO., Racine, Wis.—Broadcast seed-sower and attachments.
170. GENEVA TOOL CO., Geneva, Ohio.—Hand agricultural implements.
171. MAST, P. P., Springfield, Ohio.—Seed drill.
172. MCCORMICK HARVESTING MACHINE CO., LTD., Chicago.—McCormick steel reaper and binder.
173. OSBORNE, D. W., & Co., Auburn, N. Y.—Reaper, binder, etc.
174. PEASE, E. H., MANUFACTURING CO., Racine, Wis.—Farm winnowers.
175. RACINE HARDWARE CO., Racine, Wis.—Seed-sower.
176. THE HIRAM HOLT CO., East Stilton, Me.—Lightning hay forks.
177. THORNTON, J., Philadelphia.—Potato-diggers and corn-shellers. Agents: H. P. Gregory & Co., 104 Bourke street, west, Melbourne, and 17 Pitt street, Sydney.

GROUP VII—Continued.

CLASS 47.—*Agricultural Implements used in the Cultivation of Fields and Forests*—Continued.

178. W. A. WOODS MOWING & REAPING MACHINE CO., Hoosick Falls, N. Y.—Reaper and binder.

CLASS 48.—*Apparatus and Processes used in Agricultural Works, and in Works for the Preparation of Food, Irrigation of Land, etc.*

179. AMERICAN MACHINE CO., Philadelphia.—Scales, hardware specialties.
180. BUFFALO PITTS AGRICULTURAL WORKS CO., Buffalo, N. Y.—Thrashing machines, etc.
181. EQUITY WATER METER CO., San Francisco.—Water meter.
182. GARDEN CITY MILL FURNISHING CO., Chicago.—Flour-milling machinery.
183. GOULD'S MANUFACTURING CO., Seneca Falls, N. Y.—Cistern and force pumps.
184. HOWES & EWELL, Silver Creek.—Flour-milling machinery.
185. MOLINE CO., Moline, Illinois.—Farming implements.
186. PEABODY, H., & Co., Boston.—Farm mills.
187. REID, A. H., Philadelphia.—Dairy fixtures.
188. RICHMOND MANUFACTURING CO., Lockport, N. Y.—Wheat-cleaning machinery for flour mills.
189. SMITH, G. T. (Middlings Purifier Co.), Jackson, Mich.—Flour-milling machinery.
190. VERMONT FARM MACHINE CO., Bellows Falls, Vt.—Apparatus for cooling milk, etc.
191. THE CALIFORNIA PERFORATING SCREEN CO. San Francisco, Cal.—Exhibit.

CLASS 49.—*Implements, Models, and Plans connected with Irrigation of Land.*

192. GOLDEN STATE & MINERS' IRON WORKS, San Francisco.—Model of American dredger.
193. GREGORY, H. P., & Co., San Francisco.—Hand pumps.

CLASS 51.—*Machines and Apparatus in General.*

194. AMERICAN WALTHAM WATCH CO., Waltham, Mass.—Machines for making various parts of watch movements.
195. BAILEY WRINGING MACHINE CO., Woonsocket, R. I.—Wringing machines, etc.
196. BARNES, W. & JOHN CO., Rockford, Ill.—Hand and foot power machinery. Sole agents, Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
197. BATTLE CREEK MACHINERY CO., Michigan.—Carving and paneling machinery. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
198. BENTZEN, C. A., New York.—Washing machines.
199. BLISS, R., MANUFACTURING CO., Pawtucket, R. I.—Mallet handles, etc.
200. BLAKE, G. F., MANUFACTURING CO., New York.—Special steam pumping machinery.

GROUP VII—Continued.

CLASS 51.—*Machines and Apparatus in General*—Continued.

201. BUCHANAN WINDMILL CO., Buchanan, Mich., U. S. A.—Manufacturers of windmills, pumps, etc Agents: Welch, Perrin & Co, Moray street, South Melbourne.
202. BUFFALO FORGE CO.—Forges, blowers, etc. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
203. EAGLE LOCK CO., Terryville, Conn.—Locks.
204. ELECTRIC C. & C. MOTOR CO., New York.—Electric motors, etc.
205. EMPIRE LAUNDRY MACHINERY CO., Boston.—Laundry machinery. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
206. FAIRBANKS, E. & J. & CO., Vermont.—Weighing machines, etc.
207. GREGORY, H. P., & CO., San Francisco.—Governors, injectors, and engineers' supplies. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
208. MILLER, C. B., New York.—Railroad journal bearings. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
209. MYERS & ERVINE, Philadelphia.—Hay-fork, etc.
210. NATIONAL CASH REGISTER CO, Dayton, Ohio.—The national self-acting cash register.
211. OAKMAN, J. C., New York.—Oakman's patent bicycle.
212. SHEPARD HARDWARE CO., Buffalo N. Y.—Builders' hardware.
213. STURTEVANT, B. F., Boston.—Blowers and exhaust fans. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
214. THE FIRM OF JOHN MATTHEWS, New York.—Working carbonated beverage apparatus and supplies.
215. THE TANITE CO., Stroudsburg, Penn.—Grinding and sharpening machinery. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
216. WILLIAMS BROS., Phœnix Iron Works, Ithaca, N. Y., U. S. A.—Makers of portable engines and general machinery. Agents: Welch, Perrin & Co., Moray street, South Melbourne.
217. THE BALL ENGINE CO., Erie, Penn.—High speed automatic cut-off engines.

CLASS 52.—*Machine Tools.*

218. FRANK & CO., Buffalo N. Y.—Wood-working machinery. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.

GROUP VII—Continued.

CLASS 52—*Machine Tools*—Continue

219. FAY, J. A. & CO., Cincinnati.—Wood-v machinery.
220. GREGORY, H. P., & CO., San Francisco.- drills.
221. HENDY MACHINE CO., Torrington, Iron-working machinery.
222. LOWER & LYON, New York.—Hardw cialties.
223. MARBLE, G. W., Chicago.—Wrenc tools. Agents: H. P. Gregory & Bourke street west, Melbourne; Pitt street, Sydney.
224. OSBORNE, C. S., & CO., Newark, N. J ness, tools, etc. Agent: J. C. Oakma ney and New York.
225. PARKE & LACY, San Francisco.- working machinery.
226. PIKE MANUFACTURING CO., Pike Sta H.—Oil stones, scythe stones.
227. PRATT, WHITNEY & CO., Hartford, Engineers' supplies. Agents: H. P. & Co., 104 Bourke street west, Mel and 17 Pitt street, Sydney.
228. STANDARD HANDLE CO., Knoxville, Hammer, ax, sledge handles.
229. UPTON, G., Preston, Mass.—Sand pa omery cloth.
230. WARD, W., San Francisco.—Expande machine.

CLASS 53.—*Apparatus and Processes used ning and Rope-making.*

231. ROEBLINGS, JOHN A., & SONS, New Samples of wire work.

CLASS 55.—*Apparatus and Processes for up and for Sewing Clothing.*

232. DAVIS SEWING MACHINE CO., Wat N. Y.—Davis sewing machines.
233. THE NEW YORK SEWING MACHINE C York.—Sewing machines.
234. THE SINGER MANUFACTURING CO. York.—Singer sewing machines ar accessories.
235. WHEELER & WILSON MANUFACTURI New York.—Sewing machines.

CLASS 56.—*Apparatus used in the Manufa Furniture and Objects for Dwelling*

236. NORTON DOOR CHECK SPRING C York.—Norton door check spring.

CLASS 57.—*Apparatus and Processes Paper-making, Dyeing, and Printi*

237. AMERICAN PAPER BOTTLE CO., New Machinery for making paper bottle
238. GOLDING & CO., Boston, Mass.—I machinery, etc.
239. HALL TYPE-WRITER CO., Salem, Mas type-writer, model 1887.

GROUP VII—Continued.

CLASS 57.—*Apparatus and Processes used in Paper-making, Dyeing, and Printing*—Cont'd.

240. HAMMOND TYPE-WRITER CO., New York.—Hammond type-writing machine.
241. IVES, G. E., New Haven, Conn.—Printers' requisites.
242. MACKELLAR, SMITHS & JORDAN CO., LTD., Philadelphia.—Metal types and borders.
243. MEGILL, E. L., New York.—Printers' requisites.
244. PAGE, W. H., WOOD TYPE CO., Norwich, Conn.—Wood type.
245. ROOT, C. J., Bristol, Conn.—Printers' machinery.
246. THE AMERICAN WRITING MACHINE CO., Hartford, Conn.—Caligraph type-writer.
247. THOMSON, J., New York.—Printing machinery.
248. VANDERBURGH, WELLS & CO., New York.—Cases for holding type.
249. WYCKOFF, SEAMANS & BENEDICT, New York.—Type-writers and cabinets.
250. THE WORLD TYPE-WRITER CO., Boston.—Small portable type-writer, suited for mercantile and scholastic work.

CLASS 58.—*Machines, Instruments, and Processes used in various Works.*

251. BORNSTEIN, H., Boston, Mass.—Machinery to manufacture by hand.
252. CHATILTON, J., & SONS, New York.—Weighing scales, etc., for butchers.
253. DISSTON, H., & SONS, Philadelphia, Penn.—Saws of all descriptions.
254. HURD, O., Boston, Mass.—Razor strops.
255. SHIPMAN BROS., New York.—Fret saws.
256. THOMPSON, H. G., New Haven, Conn.—Bookbinders' wire-sewing machine.
257. TURNER, DAY & WOOLWORTH MANUFACTURING CO., Louisville, Ky.—Hickory handles.
258. CALIFORNIA STATE BOARD OF SILK CULTURE, San Francisco, Cal.—Exhibit of the silk industry.

CLASS 59.—*Carriages and Wheelwrights' Work.*

259. BOYLSTON, F., New York.—Baby carriages, etc.
260. BUSH GEAR MANUFACTURING CO., Stanton, Mich.—Carriage parts, springs, etc.
261. COLUMBUS BUGGY CO.—Buggies.
262. DANN BROS. & CO., New Haven, Conn.—Carriage woodwork.
263. FRANKLIN MOORE CO., Winsted, Conn.—Bolts and rivets for carriages and wagons.
264. HAYDON, A. & M., Philadelphia, Penn.—Carriage bolts and nuts.
265. OAKMAN, J. C., New York.—Concave springs.
266. OAKMAN, J. W., New York.—Concord hames, coach colors, etc.
267. ST. THOMAS CAR WHEEL CO., U. S. A.—Car wheels, whole and broken; test bars broken, chill pieces, etc.

GROUP VII—Continued.

CLASS 59.—*Carriages and Wheelwrights' Work*—Continued.

268. STUDEBAKER MANUFACTURING CO., South Bend, Ind.—Carriages and buggies.
269. TOLEDO CARRIAGE WOODWORK CO., Toledo, Ohio.—Spokes, hubs, rims, etc.
270. STRIEBY, H. M., & CO., Newark, N. J.—Carriage forgings. Agent: J. C. Oakman, Sydney and New York.

CLASS 60.—*Harness and Saddlery.*

271. EBEL & CO., Canton, Ohio.—Carriage and saddlery hardware. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
272. GOERTZ, A. D., Martinsburgh, Pa.—Saddlery.
273. HART & BRANDENSTEIN, San Francisco.—Harness and saddlery.
274. OAKMAN, J. C., Greenwich street, New York.—Oakman's patent lock nut washers.
275. OWEN, W. H., New York.—Horse nets and carriage whips. Agent: J. C. Oakman, Sydney and New York.
276. STANDARD GIG SADDLE CO., Jackson, Mich.—Saddlery and harness goods. Agent: J. C. Oakman, Sydney and New York.
277. WIENER & CO., Newark, N. J.—Saddlery hardware.
278. DE CAMP, LEVOY & CO., Cincinnati.—Harness and saddlery.
279. WILSON, J. A., Erie, Pa.—Leather horse nets. Agent: J. C. Oakman, Sydney and New York.
280. SARGENT & CO., Newark, N. J.—Harness mountings. Agent: J. C. Oakman, Sydney and New York.

CLASS 61.—*Railway Apparatus.*

281. DOUGHERTY RAILWAY EQUIPMENT CO., LTD., Philadelphia, Penn.—Railway apparatus.

CLASS 62.—*Electric, Pneumatic, and other Apparatus, and Processes.*

282. ELECTRICAL PROTECTIVE SUPPLY CO., Chicago, Ill.—Telegraphy, telephone, etc.
283. ELECTRIC MOTOR CO., New York.—Electric motors and apparatus.
284. THOMSON-HOUSTON ELECTRIC CO.—
The exhibit of the THOMSON-HOUSTON ELECTRIC CO. includes an electric tramway in complete working order, arc and incandescent light from the same dynamo, the transformer and direct systems of incandescent lighting, and generators and motors for the electric transmission of power.
285. WESTERN ELECTRIC MANUFACTURING CO., Chicago.—Telephone enunciators, bells, etc.

CLASS 63.—*Apparatus and Processes of Civil Engineering, Public Works, and Architecture.*

286. CHENEY HAMMER CO., Little Falls, N. Y.—Tools and hammers.
287. JENKS, H. F., Pawtucket, R. I.—Improved drinking fountain.

GROUP VII—Continued.

CLASS 51.—*Machines and Apparatus in General*—Continued.

201. BUCHANAN WINDMILL CO., Buchanan, Mich., U. S. A.—Manufacturers of windmills, pumps, etc Agents: Welch, Perrin & Co, Moray street, South Melbourne.
202. BUFFALO FORGE CO.—Forges, blowers, etc. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
203. EAGLE LOCK CO., Terryville, Conn.—Locks.
204. ELECTRIC C. & C. MOTOR CO., New York.—Electric motors, etc.
205. EMPIRE LAUNDRY MACHINERY CO., Boston.—Laundry machinery. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
206. FAIRBANKS, E. & J. & CO., Vermont.—Weighing machines, etc.
207. GREGORY, H. P., & CO., San Francisco.—Governors, injectors, and engineers' supplies. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
208. MILLER, C. B., New York.—Railroad journal bearings. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
209. MYERS & ERVINE, Philadelphia.—Hay-fork, etc.
210. NATIONAL CASH REGISTER CO, Dayton, Ohio.—The national self-acting cash register.
211. OAKMAN, J. C., New York.—Oakman's patent bicycle.
212. SHEPARD HARDWARE CO., Buffalo N. Y.—Builders' hardware.
213. STURTEVANT, B. F., Boston.—Blowers and exhaust fans. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
214. THE FIRM OF JOHN MATTHEWS, New York.—Working carbonated beverage apparatus and supplies.
215. THE TANITE CO., Stroudsburg, Penn.—Grinding and sharpening machinery. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
216. WILLIAMS BROS., Phœnix Iron Works, Ithaca, N. Y., U. S. A.—Makers of portable engines and general machinery. Agents: Welch, Perrin & Co., Moray street, South Melbourne.
217. THE BALL ENGINE CO., Erie, Penn.—High speed automatic cut-off engines.

CLASS 52.—*Machine Tools.*

218. FRANK & CO., Buffalo N. Y.—Wood-working machinery. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.

GROUP VII—Continued.

CLASS 52—*Machine Tools*—Continued.

219. FAY, J. A. & CO., Cincinnati.—Wood-working machinery.
220. GREGORY, H. P., & CO., San Francisco.—Twist drills.
221. HENDY MACHINE CO., Torrington, Conn.—Iron-working machinery.
222. LOWER & LYON, New York.—Hardware specialties.
223. MARBLE, G. W., Chicago.—Wrenches and tools. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
224. OSBORNE, C. S., & CO., Newark, N. J.—Harness, tools, etc. Agent: J. C. Oakman, Sydney and New York.
225. PARKE & LACY, San Francisco.—Wood-working machinery.
226. PIKE MANUFACTURING CO., Pike Station, N. H.—Oil stones, scythe stones.
227. PRATT, WHITNEY & CO., Hartford, Conn.—Engineers' supplies. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
228. STANDARD HANDLE CO., Knoxville, Tenn.—Hammer, ax, sledge handles.
229. UPTON, G., Preston, Mass.—Sand paper and emery cloth.
230. WARD, W., San Francisco.—Expanded metal machine.

CLASS 53.—*Apparatus and Processes used in Spinning and Rope-making.*

231. ROEBLINGS, JOHN A., & SONS, New York.—Samples of wire work.

CLASS 55.—*Apparatus and Processes for Making up and for Sewing Clothing.*

232. DAVIS SEWING MACHINE CO., Watertown, N. Y.—Davis sewing machines.
233. THE NEW YORK SEWING MACHINE CO., New York.—Sewing machines.
234. THE SINGER MANUFACTURING CO., New York.—Singer sewing machines and their accessories.
235. WHEELER & WILSON MANUFACTURING CO., New York.—Sewing machines.

CLASS 56.—*Apparatus used in the Manufacture of Furniture and Objects for Dwellings.*

236. NORTON DOOR CHECK SPRING CO., New York.—Norton door check spring.

CLASS 57.—*Apparatus and Processes used in Paper-making, Dyeing, and Printing.*

237. AMERICAN PAPER BOTTLE CO., New York.—Machinery for making paper bottles.
238. GOLDING & CO., Boston, Mass.—Printing machinery, etc.
239. HALL TYPE-WRITER CO., Salem, Mass.—Hall type-writer, model 1887.

GROUP VII—Continued.

CLASS 57.—*Apparatus and Processes used in Paper-making, Dyeing, and Printing*—Cont'd.

240. HAMMOND TYPE-WRITER CO., New York.—Hammond type-writing machine.
241. IVES, G. E., New Haven, Conn.—Printers' requisites.
242. MACKELLAR, SMITHS & JORDAN CO., LTD., Philadelphia.—Metal types and borders.
243. MEGILL, E. L., New York.—Printers' requisites.
244. PAGE, W. H., WOOD TYPE CO., Norwich, Conn.—Wood type.
245. ROOT, C. J., Bristol, Conn.—Printers' machinery.
246. THE AMERICAN WRITING MACHINE CO., Hartford, Conn.—Caligraph type-writer.
247. THOMSON, J., New York.—Printing machinery.
248. VANDERBURGH, WELLS & CO., New York.—Cases for holding type.
249. WYCKOFF, SEAMANS & BENEDICT, New York.—Type-writers and cabinets.
250. THE WORLD TYPE-WRITER CO., Boston.—Small portable type-writer, suited for mercantile and scholastic work.

CLASS 58.—*Machines, Instruments, and Processes used in various Works.*

251. BORNSTEIN, H., Boston, Mass.—Machinery to manufacture by hand.
252. CHATILTON, J., & SONS, New York.—Weighing scales, etc., for butchers.
253. DISSTON, H., & SONS, Philadelphia, Penn.—Saws of all descriptions.
254. HURD, O., Boston, Mass.—Razor strops.
255. SHIPMAN BROS., New York.—Fret saws.
256. THOMPSON, H. G., New Haven, Conn.—Bookbinders' wire-sewing machine.
257. TURNER, DAY & WOOLWORTH MANUFACTURING CO., Louisville, Ky.—Hickory handles.
258. CALIFORNIA STATE BOARD OF SILK CULTURE, San Francisco, Cal.—Exhibit of the silk industry.

CLASS 59.—*Carriages and Wheelwrights' Work.*

259. BOYLSTON, F., New York.—Baby carriages, etc.
260. BUSH GEAR MANUFACTURING CO., Stanton, Mich.—Carriage parts, springs, etc.
261. COLUMBUS BUGGY CO.—Buggies.
262. DANN BROS. & CO., New Haven, Conn.—Carriage woodwork.
263. FRANKLIN MOORE CO., Winsted, Conn.—Bolts and rivets for carriages and wagons.
264. HAYDON, A. & M., Philadelphia, Penn.—Carriage bolts and nuts.
265. OAKMAN, J. C., New York.—Concave springs.
266. OAKMAN, J. W., New York.—Concord hames, coach colors, etc.
267. ST. THOMAS CAR WHEEL CO., U. S. A.—Car wheels, whole and broken; test bars broken, chill pieces, etc.

GROUP VII—Continued.

CLASS 59.—*Carriages and Wheelwrights' Work*—Continued.

268. STUDEBAKER MANUFACTURING CO., South Bend, Ind.—Carriages and buggies.
269. TOLEDO CARRIAGE WOODWORK CO., Toledo, Ohio.—Spokes, hubs, rims, etc.
270. STRIEBY, H. M., & CO., Newark, N. J.—Carriage forgings. Agent: J. C. Oakman, Sydney and New York.

CLASS 60.—*Harness and Saddlery.*

271. EBEL & CO., Canton, Ohio.—Carriage and saddlery hardware. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
272. GORRTZ, A. D., Martinsburgh, Pa.—Saddlery.
273. HART & BRANDENSTEIN, San Francisco.—Harness and saddlery.
274. OAKMAN, J. C., Greenwich street, New York.—Oakman's patent lock nut washers.
275. OWEN, W. H., New York.—Horse nets and carriage whips. Agent: J. C. Oakman, Sydney and New York.
276. STANDARD GIG SADDLE CO., Jackson, Mich.—Saddlery and harness goods. Agent: J. C. Oakman, Sydney and New York.
277. WIENER & CO., Newark, N. J.—Saddlery hardware.
278. DE CAMP, LEVOY & CO., Cincinnati.—Harness and saddlery.
279. WILSON, J. A., Erie, Pa.—Leather horse nets. Agent: J. C. Oakman, Sydney and New York.
280. SARGENT & CO., Newark, N. J.—Harness mountings. Agent: J. C. Oakman, Sydney and New York.

CLASS 61.—*Railway Apparatus.*

281. DOUGHERTY RAILWAY EQUIPMENT CO., LTD., Philadelphia, Penn.—Railway apparatus.

CLASS 62.—*Electric, Pneumatic, and other Apparatus, and Processes.*

282. ELECTRICAL PROTECTIVE SUPPLY CO., Chicago, Ill.—Telegraphy, telephone, etc.
283. ELECTRIC MOTOR CO., New York.—Electric motors and apparatus.
284. THOMSON-HOUSTON ELECTRIC CO.—
The exhibit of the THOMSON-HOUSTON ELECTRIC CO. includes an electric tramway in complete working order, arc and incandescent light from the same dynamo, the transformer and direct systems of incandescent lighting, and generators and motors for the electric transmission of power.
285. WESTERN ELECTRIC MANUFACTURING CO., Chicago.—Telephone enunciators, bells, etc.

CLASS 63.—*Apparatus and Processes of Civil Engineering, Public Works, and Architecture.*

286. CHENEY HAMMER CO., Little Falls, N. Y.—Tools and hammers.
287. JENKS, H. F., Pawtucket, R. I.—Improved drinking fountain.

GROUP VII—Continued.

CLASS 64.—*Navigation and Life-Saving.*

288. CONSOLIDATED FIRE EXTINGUISHER CO., Hartford, Conn.—Hand and factory extinguishers and fire engine. Agent: J. C. Oakman, Sydney and New York.
289. RACINE HARDWARE CO., Wis.—Boats.
290. RADIX MANUFACTURING CO., New York.—Patent folding centerboard for boats, etc.

CLASS 65.—*Material and Apparatus for Military Purposes.*

291. QUACKENBUSH, H. M., Herkimer, N. Y.—Shot and air guns, etc.

GROUP VIII.—ALIMENTARY PRODUCTS.

CLASS 66.—*Cereals, Farinaceous Products, and Products derived from them.*

292. EMERSON'S ALBUMINOID FOOD CO., New York.—Albuminoid food.
293. GLEN COVE MANUFACTURING CO., New York. Duryea's maizena.
294. THE SAN FRANCISCO PRODUCE EXCHANGE, 425 California street, San Francisco.—Cabinet of San Francisco wood containing cereals.
295. CALIFORNIA CONSOLIDATED FOOD CO., San Francisco, Cal.—Assorted soups and potatoes.
296. MAU, SADLER & CO., San Francisco, Cal.—Cereals.

CLASS 69.—*Meat and Fish.*

297. DELAFIELD, MORGAN, KISSELL & CO., 71 Hudson street, New York.—Canned fish.
298. LYNDE & HOUGH, San Francisco.—Salt, dried, and pickled fish.
299. MAU, SADLER & CO., San Francisco, Cal.—Canned meats.
300. ARMOUR PACKING CO., Kansas City.—Canned meats.

CLASS 70.—*Vegetables and Fruit.*

301. DELAFIELD, MORGAN, KISSELL & CO., 71 Hudson street, New York.—Canned fruits.
302. MEADE & CO., San Francisco.—California raisins.
303. NEWHALL, H. M., & CO., San Francisco.—Dried fruits.

CLASS 71.—*Condiments and Stimulants, Sugar and Confectionery.*

304. MAILER, W. (BOSTON CANDY CO.), San Francisco.—American candy popcorn.
305. ROSHGCHILDS & EHRENPORT, San Francisco.—Confectionery.

CLASS 72.—*Fermented and Distilled Drinks.*

306. ANHEUSER-BUSCH BREWING ASSOCIATION, St. Louis.—Lager beer.
307. ARPAD, HARASTHY & CO., San Francisco.—California champagne.

GROUP VIII—Continued.

CLASS 72.—*Fermented and Distilled Drinks*—Continued.

308. BEADLESTON & WOERZ, New York.—Lager beer, etc. Agents: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.
309. BERGNER & ENGEL BREWING CO., Philadelphia.—Bottled malt liquors.
310. FREDERICKSBURG BREWING CO., San José, Cal.—Lager beer.
311. GREENWAY BREWING CO., New York.—Pale ale, porter, stout, etc.
312. GREENEBAUM, A., & CO., San Francisco.—Bottled wines.
313. HANNIS DISTILLERY CO., Philadelphia.—Pure rye whisky.
314. MOTT, S. R., & J. C., New York.—Cider.
315. PHŒNIX BOTTLING CO., New York.—Lager beer.
316. WOLFE, J. B., New York.—Schiedam schnapps.

GROUP IX.—SANITATION, MEDICINE, HYGIENE, AND PUBLIC RELIEF.

CLASS 73.—*Sanitary Appliances, Surgical Instruments, Plans, Models, etc.*

317. DUNCOMBE, S., & CO., San Francisco.—Air compressor, fracture bed.
318. JONES, R. B., Philadelphia.—White's "Physiological Mankind."
319. OAKMAN, J. C., Greenworth street, New York.—Oakman's odorless closets and commodes.
320. PACIFIC ELECTRIC CO., San Francisco, Cal.—Galvanic belts and trusses.
321. CLARK, N., & SONS, San Francisco, Cal.—Sewer pipes.

CLASS 74.—*Apparatus and Processes for heating and lighting.*

322. DIETZ, R. E., & CO., New York.—Lanterns.
323. OAKMAN, J. W., Greenworth street, New York.—Kerosene stoves.
324. QUICK-MEAL VAPOR STOVE CO., St. Louis.—Portable gasolene stoves, etc.
325. RATHBONE, SARD & CO., Albany.—Stoves for cooking, etc.
326. STANDARD LIGHTING CO., Cleveland, Ohio.—Oil stoves, plumbers' and tinners' furnaces, vapor stoves, furnace, and burners, etc.
327. STEAM GAUGE AND LANTERN CO., Rochester, N. Y.—Lanterns.
328. WELLINGTON MANUFACTURING CO., New York.—Street lamps, automatic torches, plumbers' and decorators' furnaces, etc.

GROUP X.—AGRICULTURE AND ASSOCIATED INDUSTRIES.

CLASS 75.—*Specimens of farm buildings and agricultural works.*

329. VICTOR MANUFACTURING CO., Newburyport, Mass.—Barn-door hanger.

GROUP XI.—HORTICULTURE.

CLASS 76.—*Conservatories, Horticultural Apparatus.*

330. BOSTON WOVEN HOSE CO., Boston.—India-rubber fire and garden hose, etc.
331. HENRY, J. T., Hamden, Conn.—Garden tools.

GROUP XII.—MINING INDUSTRIES—MACHINERY AND PRODUCTS.

CLASS 82.—*Apparatus and Processes of the art of mining and metallurgy.*

332. CYCLONE PULVERIZING CO., New York.—Cyclone pulveriser.
333. FOSTER FIRMANT AMALGAMATOR CO., Philadelphia.—Gold ore amalgamator, in complete working order.
334. PACIFIC IRON WORKS, San Francisco.—Ore concentrators.

GROUP XII—Continued.

CLASS 82.—*Apparatus and Processes of the art of mining and metallurgy*—Continued.

335. RAND DRILL CO., New York.—Rock-drill machinery.
336. THE RISDON IRON & LOCOMOTIVE WORKS, San Francisco.—The "Brefan" crusher and pulverizer and the "Risdon" ore feeder.
337. SERGEANT ROCK DRILL CO., New York.—Rock drills. Sole agents Australia and New Zealand: H. P. Gregory & Co., 104 Bourke street west, Melbourne; and 17 Pitt street, Sydney.

CLASS 83.—*Mining and Metallurgy.*

338. MATCHLESS METAL POLISH CO., Chicago.—Tripoli flour.
339. THE CALIFORNIA PERFORATING SCREEN CO., San Francisco, Cal.—Quartz-mill screens.

ORGANIZATION OF INTERNATIONAL JURIES.

List of Classes Allotted to each Jury.

[The details of the classes are given in the system of classification prepared to assist the jurors in their work.]

No. of jury and section.	Class.	Description.
1	1	Paintings in oil and water colors.
	2	Various paintings, drawings, etc., including art designs in porcelain, etc.
	4	Engravings and lithographs.
	9	General application of the arts of drawing and modeling.
2	3	Sculpture and die-sinking and art castings.
3	5	Education of children, primary instruction of adults.
	6	Organization and appliances for secondary instruction.
	7	Organization, methods, and appliances for superior instruction.
	16	Maps, geographical and cosmographical apparatus.
4	10	Printing and books.
	11	Stationery, book-binding, painting, and drawing materials.
5	12	Photographic proofs and apparatus.
6	13	Musical instruments (organs, harmoniums, and pianos).
7	14	Stringed instruments, with and without key-boards.
8	15	Mathematical and philosophical instruments.
	25	Clocks and watches.
9	17	Furniture and accessories.
	18	Upholsterers and decorators' work.
	20	Paper-hangings.
10	19	Carpets, tapestry, and other stuffs for furniture.
11	21	Cutlery and edge tools (except surgical instruments).
	22	Hardware, ironmongery, and metallic products.
12	23	Jewelry, goldsmiths and silversmiths' work and precious stones.
	24	Electroplated ware.
13	26	Perfumery and toilet soaps.
14	27	Fancy leather work and fancy articles in leather and wood of every description.
15	28	Crystal, glass, and stained glass for table use.
16	29	Pottery, china, and delph (other than fine art porcelain).
17	30	Cotton, thread, and fabrics.
	31	Thread and fabrics of flax, hemp, jute, etc.
	37	Hosiery and accessories of clothing.
18	32	Worsted yarn and fabrics.
	33	Woolen yarn and fabrics.
	35	Shawls.
	38	*Clothing* for men.
19	34	Silk and silk fabrics.
	36	Lace net, embroidery, and trimmings.
	41	Wigs and works in hair.
20*	39	Millinery, dress, fancy needle-work, and toys.
21	44	Cricket materials and other outdoor games.
22	40	Boots and shoes.
23	42	Fire-arms, ordnance, and other instruments and apparatus for the destruction of life, hunting, trapping, and fishing, and military engineering.
	43	Traveling apparatus and camp equipage.
	77	Materials and apparatus for military purposes.
24	45	Timber and products of forests indigenous and non-indigenous.
	89	Seeds and saplings of forest trees.
25	46	Vegetable products of land and sea, obtained without culture.
	47	Cultivated vegetable products of the soil not used for food.
	48	Cultivated vegetable products used for food (other than cereals and flour).
26	49	Farm and dairy products.
27	50	Meats and fish.
28	51	Wheat, oats, barley, and other agricultural products (not otherwise enumerated).
29	52	Garden and orchard products.
	85	Conservatories and horticultural apparatus.
	86	Flowers and ornamental plants.
	87	Vegetables.
	88	Fruit and fruit trees.
	90	Plants for conservatories.
30	53	Flour, bread, pastry, and confectionery.
31	54	Chemicals and chemical products.
	63	Apparatus used in chemistry and pharmacy.
32	55	Pharmaceutical products, spices, condiments, and dye materials.
33	56	Brushware and brush materials.
34	57	Wool.
35	58	Tobacco and cigars.
36	59	Leather and skins.
37	60	Agricultural implements used in the cultivation of fields and forests.
	61	Apparatus used in agricultural works and in works for the preparation of food, irrigation of land, and manufacture of artificial manures.
	62	Implements, models, plans, connected with the irrigation of lands.
	64	Machines and apparatus in general.

* Ladies.

LIST OF CLASSES ALLOTTED TO EACH JURY—Continued.

No. of jury and section.	Class.	Description.
37	65	Machine tools.
	66	Apparatus used in spinning and rope making.
	67	Apparatus used in weaving.
	69	Machinery used in the manufacture of furniture, etc.
	70	Machines and instruments used in coining, etc.
	84	Specimens of farm buildings and agricultural works.
38	68	Sewing and other machines used for making up clothing, etc.
39	71	Carriages, coach-makers, and wheelwrights' work.
40	72	Harness and saddlery.
41	73	Railway materials, rolling-stock and appliances.
42	74	Electric, pneumatic, and other apparatus.
43	8	Architectural and engineering drawings and models.
	75	Apparatus and materials of civil engineering, public works, and architecture.
44	76	Navigation, boat and ship building, and life-saving.
45	78	Tea, coffee, etc.
46	79	Wines and spirits.
47	80	Beers.
48	81	Surgical instruments and appliances.
49	82	Sanitation, hygiene, public relief.
	83	Apparatus for heating and lighting.
50	91	Apparatus used in the art of mining and metallurgy.
	92	Metals and ores.

LIST OF UNITED STATES JURORS.

Name of juror.	Exhibits.	Name of juror.	Exhibits.
N. L. McFarlane...	Sculpture and die sinking and art castings.	H. Barrow.....	Flour, bread, pastry, and confectionery.
R. S. Bradly	Education.	H. T. Smith.....	Chemicals and chemical products.
James Cook.....	Printing, book-binding, stationery, etc.	C. S. Paterson	Pharmaceutical products.
M. Wakefield.....	Musical instruments (organs, etc.).	M. Leddin	Tobacco and cigars.
W. Anderson	Do.	J. Lipshut	Do.
H. G. Bobardt.....	Clocks and watches.	L. A. Kimball.....	Agricultural implements.
R. J. Burns	Furniture, upholstering, and paper-hanging.	Do.....	Carriages, coachmakers and wheelwrights' work.
Do	Brushware and brush materials.	S. Strettle	Do.
Gilman G. Pierce ..	Cutlery, hardware, ironmongery, and metallic products.	Chas. Peake	Agricultural implements.
G. Aronson.....	Jewelry and electroplated ware.	W. Ward	Machinery.
Geo. Mason	Crystal glass and stained glass for table use.	W. B. Gray	Do.
Do	Apparatus for heating and lighting.	Jas. Anderson	Electric, pneumatic, and other apparatus.
W. Fleming.....	Fire-arms and ordnance.	Dr. D. E. Stewart .	Wines and spirits.
H. Barrow	Vegetable products.	Do.....	Surgical instruments and appliances.
Do	Agricultural products.	G. Wright, jr	Apparatus used in the art of mining and metallurgy.
		Geo. A. Elliot.....	Beers.

AWARDS TO EXHIBITORS FROM THE UNITED STATES.

[S. M.: special mention. H. M.: honorable mention.]

JURY SECTION 2.—SCULPTURE, DIE-SINKING, AND ART CASTINGS.

Order of merit.	Name and address of exhibitor.	Exhibit.
Third	The Ansonia Clock Company, Ansonia, Conn.....	Plaques.

JURY SECTION 3.—EDUCATION—ORGANIZATION, METHODS, APPLIANCES, ETC.

First and S. M.	The United States Naval Academy, Annapolis, Md..	Educational system text-books, and examination papers. Special mention for organization and completeness.
First	The State of Michigan.....	Educational system.

JURY SECTION 4.—STATIONERY, BOOKS, BOOK-BINDING, PRINTING, ETC.

First	L. Prang & Co., Boston, Mass.....	Chromo-lithography, engraving, etc.
First	W. H. Page, Wood Type Company, Norwich, Conn ..	Wood type.
First	The Governor Fountain Pen Company, Brooklyn, N. Y.	Pens.
First	J. Lowell & Co., Brooklyn, N. Y	Engraving and printing.
First	MacKellar, Smiths & Jordan, Philadelphia, Pa	Printing-type.
Second.....	Vanderburgh, Wells & Co., New York, N. Y.....	Type, cases, and frames, etc.
Third.....	The Kosmain Manufacturing Company, New York, N. Y.	Safety inks.
Third.....	The Shannon File Company	Letter files.
Third.....	The Scotford Manufacturing Company, Greenwich street, New York.	Rubber stamps, presses, etc.
H. M.....	The Portable Copying-Press and Stationery Company, Michigan.	Copying-presses.

JURY SECTION 5.—PHOTOGRAPHIC PROOFS AND APPARATUS.

First	The Southern Pacific Railway Company	Photographs.

JURY SECTIONS 6 AND 7.—PIANOS, ORGANS, STRINGED AND WIND INSTRUMENTS, ETC.

First	Behr Bros. & Co., New York.....	Upright pianos, with patent cylinder top.
First	The Estey American Organ Company, Vermont	American organs.
First	Loring & Blake, Worcester, Mass.	Organs.
First	The Smith American Organ Company, Boston.	Cabinet organs.
First	Mason & Hamlin, New York.....	Do.
Second.....	The T. M. Antisell Piano Company, San Francisco ..	Upright grand pianos.
Second.....	The Wilcox & White Organ Company, Meridian, Conn	Organs.
Third	The W. W. Kimball Company, Chicago.....	Do.
Third	Carpenter's Angelus Organ Company.....	Do.

JURY SECTION 8.—CLOCKS AND WATCHES, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS, ETC.

First and S. M.	The American Elgin National Watch Company, Elgin	Watches.
First	The Seth Thomas Clock Company, Thomaston, Conn.	American clocks.
First	The American Waltham Watch Company, Waltham, Mass.	Non-magnetic watches.
Third.....	The Ansonia Clock Company, Ansonia, Conn	Bronze clocks, etc
Third.....	The Self-winding Synchronizing Clock Company, Limited, New York.	Self-winding clocks.
H. M.....	The Waterbury Watch Company, Waterbury, Conn.	Waterbury watches.

AWARDS TO EXHIBITORS FROM THE UNITED STATES—Continued.

JURY SECTION 9.—FURNITURE, UPHOLSTERERS' AND DECORATORS' WORK, PAPER-HANGINGS, ETC.

Order of merit.	Name and address of exhibitor.	Exhibit.
First	The Charles M. Plum Upholstery Company, 1301-7 Market Square, San Francisco.	Upholstery.
Second	The Lowell Manufacturing Company, Philadelphia.	Hammoquette chairs.
Second	Wemyss Bros., Boston, Mass	Furniture.
Second	The Racine Hardware Company, Racine, Wis	Opera chairs, etc.
Second	The Trenton Spring Mattress Company, Trenton, N. J.	Wire mattresses and window-blinds.
Third	The Toledo Cot and Wringer Company, Toledo, Ohio.	Cots.
Third	Heywood Bros. & Co., San Francisco	Rattan and reed furniture.

JURY SECTION 10.—CARPETS, TAPESTRY, AND OTHER STUFFS FOR FURNITURE.

First	J. C. Wemple, New York	Spring roller-blinds or shades.
Second	E. H. Marwidell, San Francisco	Roller blinds or shades.

JURY SECTION 11.—CUTLERY, HARDWARE, IRONMONGERY, ETC.

First	C. S. Osborne & Co., Newark, N. J	Saddlers' tools.
First	The R. Bliss Manufacturing Company, Pawtucket, R. I.	Carpenters' wood-tool ware.
First	The Victor Manufacturing Company, Newburyport, Mass.	Door-hangers.
First	The A. F. Pike Manufacturing Company, New Hampshire.	Oil-stones.
First	J. Chatilton & Co., New York	Spring balances.
First	The Shepherd Hardware Company, Buffalo	Malleable castings.
First	A. & M. Haydon, Philadelphia	Carriage bolts and nuts.
First	John A. Roebling & Sons, New York	Wire rope.
First	The Eagle Lock Company, New York	Locks.
Second	The Franklyn Moore Manufacturing Company, Winsted, Conn.	Bolts.

JURY SECTION 12.—JEWELRY, GOLDSMITHS' AND SILVERSMITHS' WORK, PRECIOUS STONES, ELECTROPLATED WARE.

First	Simpson, Hall & Miller, Wallingford, Conn	Electroplate.
First	The Brooklyn Watch Case Company, Brooklyn, N. Y.	Gold watch-cases.
First	Joseph Fahy's Watch Case Company, Sag Harbor, N. Y.	Silver watch-cases.

JURY SECTION 13.—PERFUMERY AND TOILET SOAPS.

First and S. M.	Colgate & Co., New York	Toilet soaps.
First	Ladd & Coffin, New York	Perfumery.
Second	Colgate & Co., New York	Toilet waters.
Third	The Western Perfumery Company, San Francisco	Perfumery and toilet requisites.
H. M.	J. B. Williams & Co., Connecticut	Toilet soaps.

JURY SECTION 15.—CRYSTAL, GLASS, STAINED GLASS, AND GLASS FOR TABLE USE.

First	The Thomas Evans Company, Pittsburgh, Pa	Lamp-chimneys.
Second	Adams & Co., Pittsburgh, Pa	Table glassware.

JURY SECTION 16.- POTTERY, CHINA, AND DELF (OTHER THAN FINE ART PORCELAIN).

Second	The Rockwood Pottery Company	Pottery.

JURY SECTION 21.—CRICKET, FOOT-BALL, AND TENNIS MATERIALS, ETC.

First	J. C. Oakman, New York	Roller skates.
First	Bigger & Evans, Cincinnati	Do.

AWARD TO EXHIBITORS FROM THE UNITED STATES—Continued.

JURY SECTION 23.—FIRE-ARMS, MILITARY WEAPONS, APPARATUS FOR HUNTING, FISHING, ETC.

Order of merit.	Name and address of exhibitor.	Exhibit.
First and S. M.	The Winchester Repeating-Arms Company, New Haven, Conn.	Rifles, ammunition, etc., magazine shot-guns, repeating rifles.
First.....	The Marlin Fire-Arms Company, New Haven, Conn.	"Marlin" revolvers and repeating rifles, and "Ballard" single-shot rifles.
Third.....	The Toledo Cot and Wringer Company, Toledo, Ohio.	Portable bedsteads.

JURY SECTION 24.—TIMBER AND FORESTRY.

First.....	The Standard Handle Company, Knoxville, Pa.....	Ax, pick, and hammer handles.
Second.....	Smith & Young, San Francisco.....	Turned wood.
Third.....	J. J. Moore & Co., San Francisco.....	Sugar-pine doors.
H. M.....	Hurlbut Brothers, Brannan street, San Francisco....	Veneers.

JURY SECTION 25.—VEGETABLE PRODUCTS (OTHER THAN CEREALS AND FLOUR).

First.....	The Glen Cove Manufacturing Company, New York.	Maizena.
Second.....	Emerson's Albumenoid Food Company, New York..	Albumenoid food.

JURY SECTION 27.—MEATS AND FISH.

First and S. M.	Richardson & Robbins, Dover, Del.....	Potted ham.
First and S. M.	The Franco-American Food Company, New York ...	Soups.
First	Richardson & Robbins, Dover, Del.....	Luncheon ham.
Second	.....do	Ox tongues.
Third.....	The Armour Packing Company.....	Luncheon ham.
Third.....	.....do	Corned beef.
H. M.....	.....do	Ox tongues.

JURY SECTION 29.—HORTICULTURE, FLORICULTURE, ETC.

First	Maw, Sadler & Co., San Francisco	Dried fruits.

JURY SECTION 31.—CHEMICALS, CHEMICAL PRODUCTS, AND APPARATUS.

First	The Matchless Metal Polish Company, Chicago.....	Metal polishes.
H. M.....	J. Everding & Co., San Francisco.....	Soap.

JURY SECTION 32.—PHARMACEUTICAL PRODUCTS AND APPARATUS, SPICES, CONDIMENTS, ETC.

First	Gordon & Dilworth, New York	Tomato sauce.
First	Isley, Doubleday & Co., New York	Bidwell's axle grease and lubricating oils.
First	J. W. Masury & Co., New York.....	Paints.
First	H. M. Johnston, New York	Do.
First	Ellwood Cooper, Santa Barbara.....	Olive oil.
First	G. Upton, Boston.....	Liquid fish glue.
First	Valentine & Co., New York.....	Colors and varnishes.
First	Wadsworth, Howland & Co., Cincinnati	Paints.
Second	Frazer Lubricator Company, New York	Axle-grease.
Third.....	B. Moore & Co., Brooklyn.....	Kalsomine.
Third.....	Woolsey	Do.
Third.....	Borne, Scrymser & Co., New York	Mineral and lubricating oils.
H. M.....	G. S. Cheney & Co., Boston.....	Roots, barks, herbs, etc.

JURY SECTION 33.—BRUSHWARE, BRUSH MATERIALS, ETC.

First	J. L. Whiting & Son, Boston	Paint-brushes.
First	The California Glue Works, San Francisco	Glue.

AWARDS TO EXHIBITORS FROM THE UNITED STATES—Continued.

JURY SECTION 35.—TOBACCO AND CIGARS.

Order of merit.	Name and address of exhibitor.	Exhibit.
First and S. M.	T. C. Williams & Co., Richmond, Va	Manufactured tobacco; special mention for aromatic and light-pressed.
First and S. M.	D. Dunlop, Petersburgh, Va	Manufactured tobacco; special mention for black work.
First and S. M.	Allen & Ginter, Richmond, Va	Cigarettes and cut tobacco.
First and S. M.	William Cameron & Brothers, Petersburgh, Va	Manufactured tobacco.
First	Goodwin & Co., New York	Cut cigarette tobacco.
Second	Alexander Cameron & Co., Richmond, Va	Manufactured tobacco.
H. M.	Horn & Co., San Francisco	Cigars.

JURY SECTION 36.—LEATHER, SKINS, ETC.

First	E. S. Ward & Co., Newark	Enameled leathers.
Second	S. Bloom, San Francisco	Collection of leathers.
Second	A. R. Kron & Co., Santa Cruz, Cal	Do.

JURY SECTION 37.—AGRICULTURAL IMPLEMENTS AND PROCESSES.

First and S. M.	The McCormick Harvesting Machine Company, limited, Chicago, Ill.	Steel reaper and binder.
First and S. M.	Aultman, Miller & Co., Akron, Ohio	"Buckeye" reapers and binders, mowers, etc.
First and S. M.	G. T. Smith (Middlings Purifier Company), Jackson, Mich.	Centrifugal reels and middlings purifiers.
First and S. M.	The firm of John Matthews, New York, N. Y.	Working carbonated beverage apparatus.
First	— Mace	Ice-chest.
First	Baker & Hamilton, Benicia Agricultural Works, New York, N. Y.	Sulky plow.
First	The Economist Plow Company, South Bend, Ind	Plows.
First	The Auburn Manufacturing Company, New York, N. Y.	Agricultural implements.
First	The Geneva Tool Company, Geneva, Ohio	Do.
First	P. P. Mast, Springfield	Seed drill.
First	The W. A. Woods Mowing and Reaping Machine Company, Hoosick Falls, N. Y.	Reaper and binder.
First	L. Allen, Philadelphia, Pa	Hand seed-sowers.
First	The Planet Garden Tool Company	Garden tools.
First	Bickford and Hauffmann, Macedon, N. Y	Seed and manure drill.
First	The Kilburn Windmill Company	Windmill pumps.
Second	The Pitts Agricultural Works Company, Buffalo	Agricultural implements and machines.
Second	D. Bradley Manufacturing Company, Chicago	Plows.
Second	Derby & Ball, Bellows Falls, Vt	Agricultural-implement handles.
Second	A. H. Reid, Philadelphia	Dairy fixtures.
Second	D. W. Osborne & Co., New York	Reaper and binder.
Second	The Deering Reaper and Binder and Mowing Machine Company.	Harvesting machinery.
Second	Park & Lucey, San Francisco	Windmill and steam pump.
Second	The Vermont Farm Manufacturing Company, Bellows Falls, Vt.	Apparatus for cooling milk, churns, etc.
Third	Williams Bros., Ithaca, N. Y	Portable agricultural engines.
Third	The Hiram Holt Company, East Stilton, Me	Lightning hay-forks.
Third	Meyers & Ervine, Philadelphia	Hay-forks, etc.
H. M.	The Buchanan Windmill Company, Buchanan, Mich.	Windmill pump.

JURY SECTION 37A.—MACHINERY AND APPARATUS IN GENERAL.

First and S. M.	The Bissell Carpet Sweeper Company, New York	Carpet sweeper.
First and S. M.	The National Cash Register Company, Dayton, Ohio	National self-acting and cash register.
First and S. M.	The Colt's Machine Company	Colt's armory printing machine.
First and S. M.	The G. F. Blake Manufacturing Company, New York	Direct-acting feed-pumps.
First	Hall Type-writer Company, Salem, Mass	Type-writer model, 1887.
First	The American Type-writing Machine Company, Hartford, Conn.	Caligraph type-writer.

AWARDS TO EXHIBITORS FROM THE UNITED STATES—Continued.

JURY SECTION 37A.—MACHINERY AND APPARATUS IN GENERAL—Continued.

Order of merit.	Name and address of exhibitor.	Exhibit.
First	Wyckoff, Seamans, and Benedict, New York	Remington type-writer.
First	The Ball Engine Company, Erie, Pa	High speed automatic cut-off engines.
First	H. B. Smith	Bicycles.
First	Disston and Sons, Philadelphia	Saw-grinding machinery.
First	Howes and Ewell, Silver Creek	Grain-cleaning machine.
Second	The Hammond Type-writer Company, New York	Hammond type-writer.
Second	The Cambridge Company	Washing-machine.
Second	T. R. Pickering & Co., Portland, Conn	Engine-governors.
Second	B. F. Sturtevant, Boston	Blowers and exhaust fans.
Second	A. O. Cook & Son, San Francisco	Leather belting.
Second	E. J. Fairbanks & Co., Vermont	Weighing-machines.
Second	Gould's Manufacturing Company, Seneca Falls, N. Y.	Cistern and force pumps.
Third	Golding & Co., Boston	Printing machinery.
Third	Edison Fire Extinguishing Company, United States	Fire-extinguishers.

JURY SECTION 37B.—MACHINE TOOLS AND MACHINERY USED IN THE MANUFACTURE OF FURNITURE.

First and S. M.	J. A. Fay & Co., Cincinnati	Wood-working machinery.
First and S. M.	Greenlee Bros., Chicago	Do.
First and S. M.	Henry Disston & Sons, Philadelphia	Circular and flat saws.
First and S. M.	The Bridgeport Gun and Implement Company	Forstner auger-bits.
First	Frank & Co., Buffalo	Wood-working machinery.
First	Goodell & Waters, Philadelphia	Do.
First	The Tanite Company, Stroudsburgh	Grinding and sharpening machinery.
First	W. Ward, San Francisco	Metal-expanding machine.
Second	W. & J. Barnes & Co., Rockford, Ill	Wood-working machinery.
Second	J. A. White, New Hampshire	Do.
Second	S. A. Woods, New York	Do.
Second	H. B. Smith, New Jersey	Do.
Second	The Hendy Machine Company, Torrington	Shaping machinery.
Second	The Buffalo Forge Company, Buffalo	Portable smiths' forges, with fans.
Second	The Cheney Hammer Company, New York	Hammer-handles.
Second	The Turner, Day and Woolworth Manufacturing Company, Louisville, Ky.	Ax and pick handles.
Second	Wetherby, Rugg & Richardson, Massachusetts	Wood-working machinery.
Third	Wiley & Russell, Massachusetts	Stocks and dies.
Third	H. S. Beach, Pennsylvania	Wood-working machinery.
H. M	C. S. Osborne & Co., Newark	Plumbers' tools.

JURY SECTION 38.—SEWING AND OTHER MACHINES FOR MAKING UP CLOTHING.

First and S. M.	The Singer Manufacturing Company, New York	Collection sewing-machines.
First and S. M.	The Empire Laundry Machinery Company, Boston	Steam-laundry machinery.
First	The Wheeler and Wilson Manufacturing Company, New York.	Collection sewing-machines.
First	The Davis Sewing Machine Company, New York	Family sewing-machine.
Second	The New York Sewing Machine Company, New York.	Do.
Second	The Bailey Wringing Machine Company, Woonsocket, R. I.	Collection household wringers.

JURY SECTION 39.—CARRIAGES, COACHMAKERS' AND WHEELWRIGHTS' WORK.

First	Dann Bros. & Co., New Haven, Conn	Collective exhibit of bent timber.
First	W. Fleming (agent for Studebaker)	Collective exhibit of buggies.
Second	The Gendron Iron Wheel Company, Toledo, Ohio	Perambulators.
Second	The Abbott Buggy Company, Chicago	Under-carriages.
Second	The Columbus Buggy Company	Collective exhibit of buggies and material.
Second	The Cortland Wagon Company	Do.
Third	F. Boylston, New York	Perambulators.

JURY SECTION 40.—HARNESS AND SADDLERY.

First and S. M.	J. R. Hill & Co	Saddlery and harness.
Second	The Standard Gig Saddle Company, Jackson, Mich.	Saddlery.
Third	Sargent & Co., New York	Harness mountings.
Third	J. Wilson, Erie, Pa	Horse nets.

AWARDS TO EXHIBITORS FROM THE UNITED STATES—Continued.

JURY SECTION 41.—RAILWAY MATERIALS, ROLLING STOCK, AND APPLIANCES.

Order of merit.	Name and address of exhibitor.	Exhibit.
Second	The Kalamazoo Rail Tricycle Company, New York..	Rail tricycle.

JURY SECTION 42.—ELECTRICAL, PNEUMATIC, AND OTHER APPARATUS.

First and S. M.	The Thomson-Houston Electric Company, Boston...	Electric-tramway, motors, and dynamos.
First	The Western Electric Manufacturing Company, Chicago.	Electric bells and fittings.

JURY SECTION 44.—NAVIGATION, SHIP-BUILDING, LIFE-PRESERVING, ETC.

Third.....	The Racine Hardware Company, Wisconsin	Boats.

JURY SECTION 46.—WINES, SPIRITS, AND LIQUORS.

First	The Hannis Distillery Company, Philadelphia.....	Whisky.
First	A. Greenbaum & Co., San Francisco.....	White wine.
Second ...	J. B. Wolfe, New York	Schnapps.

JURY SECTION 47.—BULK BEERS AND STOUT, BOTTLED BEERS AND STOUT, AND CORDIALS, ETC.

First and S. M.	S. R. & J. C. Mott, New York.....	Sweet cider.
First	.....do	Cider, "Golden Russet."
First	.....do	Cider, "Sparkling Crabapple."
First	Beadleston & Woerz, New York	Lager beer, "Culmbacher."
First	H. Clausen & Sons, New York	Lager beer, "Phœnix."
Second	The Bergner and Engel Brewing Company, Philadelphia.	Lager beer.
Second	The Anheuser-Busch Brewing Association, St. Louis.	Lager beer, "Faust."
Second	E. Conrad & Co.....	Lager beer, "Budweiner."
Third.....	Beadleston & Woerz, New York	Lager beer, "Imperial."
Third.....	The Greenway Brewing Company, New York	Lager beer, "Germania Export."
Third.....	The Bergner and Engel Brewing Company, Philadelphia.	Lager beer, "Tannhauser."
Third.....	The Anheuser-Busch Brewing Association, St. Louis.	Lager beer, "Erlanger."
Third.....	.....do	Lager beer, "St. Louis."
Third.....	.....do	Lager beer, "St. Louis Pale."

JURY SECTION 48.—SURGICAL INSTRUMENTS AND APPLIANCES.

First	William S. Duncombe & Co., San Francisco	A fracture-bed.
Second	The C. and C. Electric Motor Company, New York...	Primary battery for lighting small exploring lamps.
Second	The Pacific Electric Company, San Francisco	Electric apparatus.

JURY SECTION 49.—FILTERS, GAS-MAKING MACHINES, SANITARY APPLIANCES, LIGHTING AND HEATING APPARATUS.

First and S. M.	Rathbone, Sard & Co., Albany	Stoves.
Third.....	R. E. Dietz & Co., New York.....	Lanterns.
Third.....	J. C. Oakman, New York.....	Oakman's siphonic odorless closets.
H. M	The Quick Meal Vapor Stove Company, St. Louis ...	Portable gasoline stoves.
H. M	The Wellington Manufacturing Company, New York.	Lamps, torches, etc.

JURY SECTION 50.—MINERALS, MINING MACHINERY, AND APPARATUS.

First and S. M.	The Ingersoll Lightning Rock Drill Company, New York.	Rock drill; special mention for its perfection of stroke.
First	The Rand Drill Company, New York	Rock-drilling machinery.
Second	The Knowles Duplex Pumps Company, New York and Boston.	Duplex compound mining pumps.
Second	The Climax Fuse Company, New York	Safety blasting fuses.
Third.....	The Foster-Firmin Amalgamator Company, Philadelphia.	Gold-ore amalgamator, in working order.
H. M	The California Perforating Screen Company, San Francisco.	Quartz-mill screens.
H. M	The Risdon Iron and Locomotive Works Company, San Francisco.	The "Bryan roller mill" and "Risdon ore-feeder."

CHAPTER II.

REPORTS RELATING TO THE EXHIBITION.

OFFICES OF THE UNITED STATES COMMISSION.

REPORT OF THE SECRETARY AND DISBURSING OFFICER TO THE COMMISSION, AND SUPERINTENDENT OF THE UNITED STATES COURT.

SIR: Having been detailed for duty in connection with the Melbourne International Exhibition, I reported to the Chief Commissioner on the 25th day of April, 1888, and at once opened and took charge of an office in Washington, D. C.

All those who had applied for space were informed that their applications had been received and would be attended to, and further applications were filed. Through the courtesy of the Associated Press, articles appeared in the principal papers informing merchants that offices had been opened in Washington and San Francisco.

Assistant Commissioner F. B. Wheeler left San Francisco for Melbourne at the beginning of May, taking with him all applications for space that had been received up to that time. The office at Washington was closed May 21, and Assistant Commissioner Thomas B. Merry and I left San Francisco for Melbourne early in June, arriving in Melbourne June 29.

INSTRUCTIONS.

Before starting the following instructions were given to me by the Chief Commissioner and read to all the Commissioners in Melbourne on the day of our arrival:

OFFICE OF THE COMMISSIONER FOR THE UNITED STATES
TO THE MELBOURNE EXHIBITION,
312 *California Street, San Francisco, Cal., May* 31, 1888.

DEAR SIR: Herewith I hand you four drafts upon Messrs. Brown, Shipley & Co., of London, bankers, for the aggregate sum of £1,900, drawn in first and second of exchange and numbered as hereinafter designated.

No. 1 for	£500
No. 2 for	500
No. 3 for	500
No. 4 for	400
Total	1,900

As yourself and Assistant Commissioners Wheeler and Merry, also the Consul-General, will be on the ground thirty days prior to my arrival in Melbourne, it is desirable that the Board should be in thorough organization at once, as much of the business intrusted to and devolving upon the Commission will have been accomplished before I can reach there. I would therefore suggest that a temporary organization of

the Board be had, with one of the Assistant Commissioners as its temporary chairman and yourself as secretary, together with the Honorary Commissioners already designated to act as such in behalf of the United States. As the amount appropriated by Congress for defraying the expenses of the American portion of the Exhibition is very small, the utmost caution will be necessary in incurring expenses for getting the American exhibit in order. I would therefore suggest that before bills are incurred, the Commissioners shall consider each proposed expenditure and jointly concur in authorizing it. It is desirable that all the business of the Commission be conducted in a spirit of harmony, which, I am confident, you will be as anxious to establish and preserve as myself, and in which, I trust, each and every member of this Commission will voluntarily aid you and at all times refrain from anything which might tend to impair your efficiency as an officer.

I remain, dear sir, your obedient servant,

FRANK MCCOPPIN,
U. S. Commissioner.

Lieut. A. MARIX, U. S. N.,
Secretary and Disbursing Officer.

In accordance with these instructions regular meetings were held three times a week, and these instructions fully carried out.

SPACES ASSIGNED.

Immediately after our arrival spaces were assigned to the applicants, and marked out on the floor of the court, and on the 1st day of July the work of unpacking and erecting the exhibits was commenced.

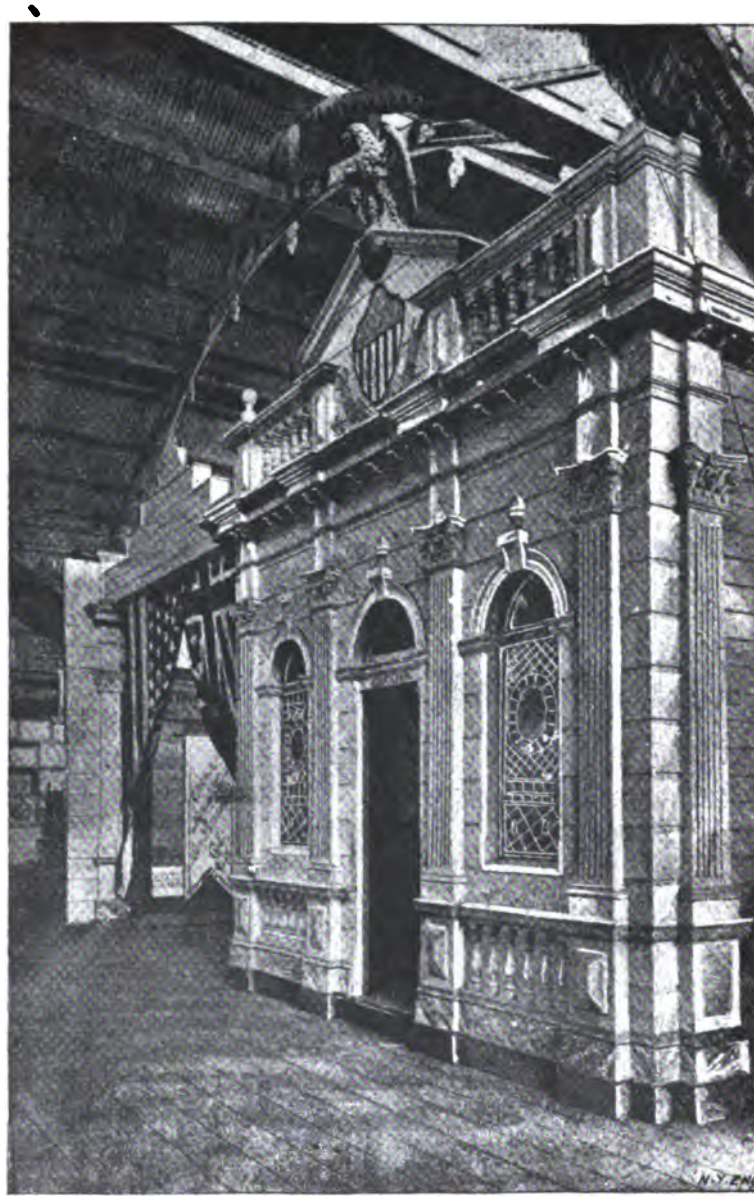
Owing to the inadequacy of the main building, in regard to size, several annexes had to be erected, and our exhibits had to be placed in seven different courts. This was unfortunate and prevented our making as impressive a display as we could have done otherwise; yet we fared better than the other nations in this respect, as their exhibits were even more distributed. Our sections were as follows:

	Square feet.
Main Industrial Court	40,000
Small Industrial Court under the dome for jewelry and fine exhibits	3,900
Educational Court	495
First Machinery Court (in motion)	18,000
Second Machinery Court (in motion)	13,050
Third Machinery Court (agricultural, in motion)	4,556
Fourth Machinery Court (principally silent)	9,400

The Educational Court was at one end of the Industrial Section; and the first machinery court, abreast of the latter, the two communicating by three large gates. There was a direct communication between the first and second machinery courts, and the third and fourth were also together, and communication between them by two doors.

INDUSTRIAL COURT.

The Industrial Section was 482 feet long and 83 feet wide. The exhibits were placed in three rows, two of these facing each other, with a passage 10 feet wide between them; and the third row facing the German Court, and having a passage of the same width between the two.



UNITED STATES EDUCATIONAL COURT.

Nearly all the exhibits were placed on platforms about 18 inches high, and made a more substantial appearance than those of the other courts, most of which were on the bare flooring. Our having two large passages from which to view the exhibits also proved to be a great advantage, and brought to our court the bulk of the visitors. The people showed a decided objection to dodge around show cases, and hunt for exhibits. The stream of visitors passed down the Grand Avenue of Nations, and after reaching the northern end turned into the two passages of our court. In passing into the garden at the northern gate, our first and second machinery courts were on either side and easily accessible. The entrance to the Industrial Section was decorated in white and gold, with American shields and flags. There was also a large arch reaching to the roof of the building, on which the names of all the States and Territories were inscribed in gold letters.

The offices of the Commission were located in this section, being a plain building with two rooms, surrounded by a garden. On the Educational Court, a substantial building, representing a school-house, was erected. From the 1st of July until the opening day a gang of laborers was employed to assist exhibitors in unpacking and erecting their exhibits.

REMOVAL OF EXHIBITS.

The Exhibition having been formally closed on January 31, 1889, a gang of laborers was again employed from that day until March 31, in order to assist the exhibitors in packing and removing their goods.

Up to March the 11th, the public was admitted between 11 a. m. and 6 p. m., at the usual rate of admission. During this space of time many exhibits were removed, and others sold by auction. All the United States Government property, other than that which was sent to the Paris Exposition, was also sold by auction. After March 11 the public was not admitted, and exhibitors were directed to have their goods removed by March 31, in accordance with the following regulations, viz:

CENTENNIAL INTERNATIONAL EXHIBITION,
Melbourne, 1888.

The attention of exhibitors is drawn to the 25th clause of the Regulations contained in the Official Prospectus issued in February, 1887, and under which they undertook to exhibit, viz:

"Immediately after the close of the Exhibition, exhibitors or their duly appointed agents shall remove their effects, and complete such removal by the 31st of March, 1889. Goods then remaining will be removed by orders of the Executive Commissioners, and sold by auction, or otherwise disposed of under the direction of the Executive Commissioners, and the net proceeds handed to the exhibitors or the duly appointed agents."

By order:

GEORGE T. A. LAVATER,
Secretary.

FEBRUARY 16, 1889.

SPECIAL UNITED STATES COURT (UNDER DOME).

REPORT ON THE EXHIBITION AT LARGE.

By JAMES SMITH, Esq., *of Melbourne.*

Originally intended to cover a space of not more than 24 acres, the buildings erected in one of the public reserves of the city cover a space of 35½ acres, or 12½ acres less than the area occupied by the Centenary structure in Philadelphia. What may be called the main building was erected for the International Exhibition of 1880, and nearly one-half of it has been reserved for musical entertainments, two of which have been given almost daily since the opening of the show on the 2d of August last. A continuous gallery, carried round the whole of this edifice, has served for the reception of pictures and statuary, including a large loan collection sent out from Great Britain, a similar collection lent by residents in Victoria, and a fine display of oil paintings by contemporary artists in France, Germany, and Belgium, as well as by those resident in the colony. One half of the extensive annexes are occupied almost exclusively by Australasian exhibits, the only exception being a comparatively small space assigned to Canada. The other half is divided into unequal sections for the use of the United States, Great Britain, France, Germany, Austro-Hungary, Belgium, Holland, Spain, Portugal, Switzerland, Italy, Turkey, China, Japan, India, Ceylon, New Guinea, North Borneo, Madagascar, and Seychelles. But many of these countries are represented by exhibits so few in number and so unimportant in character as to be disentitled to any further mention.

GREAT BRITAIN.

As might be expected, Great Britain makes an imposing display of all kinds of machinery, metal manufactures, alimentary products, textile fabrics, fictile wares, weapons, cutlery, chemical and pharmaceutical products, and mechanical apparatus of all kinds.

PORCELAIN AND POTTERY.

One of the branches of art manufacture in which England excels is that of porcelain and pottery; and nothing can be more beautiful of its kind than the ornamental ceramics with an ivory body exhibited by

the Royal Worcester Works, the form, substance, and surface of the articles being as dainty and delicate as their decorations. Next to these in attractiveness and importance is a very large collective exhibit by the Derby Crown Porcelain Company, Josiah Wedgewood & Sons, Doulton & Co., of Burslem, and Doulton & Co., of Lambeth. The first of these companies was formed about eleven years ago by the then managing director of the Royal Porcelain Works at Worcester, who severed his connection with the latter, and purchased the site of the old Derby work-house, and transformed it, with numerous additions, into a china factory, with the intention of reviving in it a local industry which had been established there somewhere about the year 1750, tradition reports by a Frenchman named Planché, who was the ancestor of the well-known dramatist and antiquary who died at a very advanced age not long ago. The porcelain achieved a high reputation from 1777 to 1815, partly on account of the excellence of the workmanship, and partly because none but perfect goods were allowed to leave the premises. This rule was discontinued after the last-named year, and the works began to decline in consequence. They were finally closed in 1848, and most of the workmen migrated into Staffordshire and Worcestershire, although a few remained and commenced making "Derby china" in other premises. It may be interesting to mention that it was a Derby workman, who, while engaged in some experiments to recover the secret of the biscuit composition, accidentally produced the material known as "Parian," which has since been brought to such perfection by the Copelands and Mintons.

Since the resuscitation of the industry of the Derby Crown Porcelain Company not only have the old fabrics been equaled in form, color, and material, but they have been excelled in point of decoration. Among the names of the artists engaged in this work we find those of Count Hotezendorff, a clever landscape painter; James Rouse, whose talent lies in the same direction; I. Platts and H. Deakin, both of whom are figure painters; while the principal modeler is Mr. W. H. Hogg, who is an exhibitor at the Royal Academy.

The wares produced combine hardness and tenacity of substance with tenuity and transparency, and the decorations, in which a profusion of raised gold and delicate colors are employed, are often of a sumptuous character. Such an epithet may be justly applied to a pair of Persian vases, with a canary-colored ground, enriched with geometrical ornaments and with bosses of ruby and gold; the handles and covers pierced, and the birds and foliage by which the hilts are adorned, laid on in dead and burnished gold, the former constituting the shadows, as it were, of the picture.

Near these is a beautiful group of three vases, with gold ornaments on a Pompadour rose ground; the covers, necks, and handles, more particularly, being choice specimens of Oriental ornamentation, modified so as to bring it into harmony with the freer treatment of the more

modern designs employed in the decoration of the dominant division of each of the vessels.

Noticeable, also, is a pair of vases with a ground resembling in color that of one variety of birds' eggs, upon which some peacock's feathers of different sizes seem to have been carelessly thrown, although their curves have really been arranged with the happiest skill, and the lustrous iris of each almost rivals the metallic brilliancy of the originals. Two large vases with a creamy ground, decorated with lotos leaves in dead and burnished gold, may be referred to as instructive examples of elegance of form and subdued richness of ornament. The same shape is repeated in a vase with a slate-colored body, with a simple and recurrent ornament, partially Alhambresque in character, in burnished gold, and the neck and covers of Derby blue. Two small canary-colored Persian vases, daintily decorated, are a delight to the eye. Nor must we omit to mention, among other cabinet specimens, a pair of pot-pourri vases with Pompadour rose panels, symmetrically decorated with figures that are partly geometrical and partly composed of scrolls and flowing lines, jeweled in places, the panels being separated from each other by black bands similarly treated, the general effect being extremely harmonious.

There is no name more prominently or honorably identified with the rise and progress of ceramic art in England than that of Josiah Wedgewood, the son and grandson of a potter. He began in a small way at Burslem, had the good fortune to attract the notice and obtain the patronage of the royal family, and becoming prosperous in his circumstances he established a colony in the vicinity, where his factory covered 6 acres, and a village grew up around it. By his marriage with his seventh cousin, Sarah Wedgewood, he eventually became possessed of a fortune of £20,000, and the greater his prosperity the more liberally he expended the resources at his command in the prosecution of researches for the discovery of new materials and improved processes, and in engaging men of the highest ability to execute designs and to invent and apply decorations. Flaxman, the sculptor, was one of these—a man whose art had been founded on the highest examples of the purest Greek art, poetical in sentiment and pure and refined in taste. Admirable in his modeling and skillful in the grouping and arrangement of the figures with which he enriched the jasper plaques and vases, he elevated the decoration of ceramic wares into a branch of the fine arts, and revived the methods and traditions of ancient Greece in this respect. The jasper vases in black basalt, pale blue and pale green, with classic figures in white relief, of the purest texture, encircling their dominant divisions; the Golconda ware, a recent invention, in which gold ornaments enrich a jasper body; a large vase of sage-green on a pedestal, the principal decoration of which is the Apotheosis of Homer; and another, adorned with a group, of singularly graceful design, representing the Dance of the Houris, after one of Flaxman's choicest models, may be

singled out for special praise; although, indeed, but little else can be awarded to the collective exhibit, which proves that, under its present management, this famous factory has not allowed the Staffordshire Renaissance of 1862 to subside.

Lambeth seems to have been the seat of pottery works for upwards of two centuries, and the fabrication of delft-ware, in addition to the articles previously manufactured there, was commenced by a Dutchman, who came over in 1676, on the recommendation of the English ambassador at the Hague, and took out a patent for making the glazed tiles which were formerly used so largely for lining fire-places with. When Mr. John Doulton, who had received his technical instruction at the Fulham potteries, established himself in Vauxhall Walk, about the year 1815, his modest works were in the midst of a rural suburb, with an acre of garden ground attached to them, a fish-pond, an orchard, and a vinery, and an old-fashioned wind-mill, which figured in some of the early sketches of George Morland, who lived in the Lambeth road, close by. To-day the Doulton works are surrounded by a densely-populated district, and in lieu of the 12 workmen who were employed in the year 1834, there are now 2,000 in the pay of the firm at Lambeth alone; and Mr. Henry Doulton, the present senior member of it, who entered the works at the age of fifteen, was honored with the Albert medal of the Society of Arts in 1885, the Prince of Wales remarking as he presented it:

> This medal, instituted twenty-two years ago, has been awarded only to those who for distinguished merit in promoting arts, manufactures, and commerce, are worthy of receiving it. From all you have done, Mr. Doulton, for art, not only in this country but throughout the world, I do not think there is any one more deserving of the high compliment we are about to pay you.

It should be added, however, that it is only through the excellent instruction communicated at the Lambeth School of Art that the faience manufactured at that place has been enabled to acquire the great reputation it deservedly enjoys. This school was established in 1854, by the Rev. W. Gregory, the then vicar of St. Mary's, Lambeth, and since that time, under the direction of Mr. John Sparkes, who was determined to prove that there is exquisite taste and endless inventive power latent in Englishmen and Englishwomen, more particularly among the latter, some excellent artists have been trained for decorative work. These include Mr. George Tinworth, whom a competent judge has pronounced to be "the most creative religious sculptor of the day;" Mr. Eyre, whose figure painting belongs to the highest kind of decorative art; Mr. A. E. Pearce, whose ability is shown in designing forms more particularly; Mr. F. A. Butler, a deaf and dumb artist of great versatility; the late Miss H. B. Barlow, who was so skillful in etching figures upon the still soft clay; her sister Florence; Miss K. Rogers, who excels in depicting flowers; Miss L. Watt, who paints children's figures; Miss E. Lewis, who makes landscapes her specialty; and many other young ladies who

find congenial and remunerative employment in the decoration of artistic pottery.

Burslem is known as "the mother of the potteries," and was famous for its earthenware as far back as the year 1686; but it was not until the year 1880 that the old Nile-street works passed into the hands of Messrs. Doulton, of Lambeth, who soon applied themselves with characteristic energy and spirit to the perfecting of the material they have since wrought up into such beautiful forms, besides imparting to it such a softness of surface and delicacy of tone as well as lightness of substance as to render it indistinguishable, at a little distance, from porcelain. And with this perfected substance to work upon, the firm resolved that when intended for ornamental purposes its decoration should be worthy of the material, and therefore they secured the co-operation of trained artists, while at the same time taking advantage of the discoveries of chemical science with respect to glazes and metallic ornaments. Among the wares produced are two varieties, the "Severn" and the "Trent," which certainly take rank among the highest achievements of the works at Burslem. According to the testimony of an expert, the first "is remarkable for the brilliancy of its under-glaze painting, which no atmospheric influence can ever affect, and for the metallic richness of neck and handle;" while the second presents a vellum-like body, "on which an accidental spray of flowers and foliage is gracefully thrown, harmonizing with the various bronzes of neck, handle, and base, and presenting a whole that is eminently grateful to the eye and pleasant to the touch."

Conspicuous among the exhibits of Burslem ware is a large bowl with a lace body, the ornamentation of which has been suggested by Japanese models, the lotos flowers and leaves being treated with that literalness which is held to justify the exact reproduction of a torn leaf, a broken spray, or a faded petal; while the sinuous dragon, which is superimposed in high relief, and is gilded to represent metal, is one of those fantastic conceptions which are dear to the Japanese mind. The same figure is introduced upon a smaller vessel, with a cream-colored body, upon which some choicely-painted flowers have their outlines accentuated by gold penciling; while the neck is covered with an extremely delicate pattern in oxydized silver on a chocolate ground, and the base is enveloped by a broad band of crocodile skin, imitated in color and marking with striking verisimilitude. A vase having a Chinese red ground, overrun with an intricate ornament in dead gold, has a neck so closely resembling beaten metal as to require to be handled before the deception is ascertained. Upon some of the vases in which groups of flowers naturally or conventionally treated have been painted on a ground of closely reticulated net, a secondary scheme of decoration has been introduced in the shape of uncolored flowers, the forms of which appear to have been lightly impressed upon the lace body. A large pair of vases, with a diapered ground of dead gold, upon which

groups of irises have been painted in Derby blue, with a strong, decisive brush, are highly effective for ornamental purposes. The contour of a two-handled vase, with a lacework neck and base, and a lustered band of Raffaelesque ornament running round the middle division of the vessel strikes one as very agreeable, owing to the combination and contrast of a convex and a concave curve. Some mosaic ware, in which the delicate tessellation of the Florentine workers in this material has been dexterously imitated in appropriate designs, while the mountings resemble hammered metal, should not escape encomium. The simulation of metals by the manufacturers of fictile wares is being carried to great perfection, and gold, copper, and bronze are imitated very deceptively; although critics like Mr. Ruskin would probably impugn the legitimacy of such a proceeding.

HARDWARE.

Great Britain does a large trade with her Australian colonies in hardware; and the Coalbrookdale Company makes a good display of its multifarious products, consisting of cast-iron gates, verandas, fountains, candelabra, mantel-pieces, chairs and tables, flower-stands, hall furniture, garden ornaments, plaques, and other objects in the construction of which hammered, wrought, and cast iron, and electro-bronze are being so largely employed. But the extent to which brass is coming into fashion for both useful and ornamental purposes is aptly illustrated by the exhibits, among others, of J. Cartland & Son, of Birmingham, who claim to be the largest producers of furnishing and general brass work in the world; and by those of Messrs. R. & C. Harcourt, of the same place. Screens with revolving glass panels, candelabra, door panels, mirror frames, wall brackets, what-nots, sconces, banner-screens, ink-stands, bedsteads, fenders, fire-dogs, jewel caskets, letter racks, and quite a bewildering variety of articles for use and ornament, not to speak of others intended for ecclesiastical purposes, are now being manufactured of that material; and all the better kind of work is executed in repoussé. The designs denote, in general, a recurrence of the principles and motives of the French Renaissance, and are frequently of marked elegance. But, inasmuch as brass is a metal peculiarly liable to tarnish, it has been found necessary to have recourse to science for the means of preserving it from contact with the atmosphere; and this has been discovered in a liquid, the composition of which is a secret. When applied to the surface of any brazen object, this hardens into a translucent coat, which resists heat, can be washed with soap and warm water, and remains unaffected by anything short of friction with sand-paper or some other rough material. The church altar furniture, crosses, massive candlesticks, communion vessels, monstrances, pyxes, repoussé dishes, and other articles in brass manufactured by Messrs. Innes & Willis, of London, may be mentioned *in terms of* special commendation.

GLASSWARE.

In the fabrication of glassware, both for table use and ornamental purposes, the manufacturers of Staffordshire appear to have taken and to maintain the lead in Great Britain. These are well represented by T. Webb & Sons, of Stourbridge, who have established a branch house in Melbourne, and Messrs. Stuart & Sons of the same place. Purity, brilliancy, and transparency are the notable characteristics of the table glass exhibited in such glittering variety by both these firms, the sparkling and diamond-like facets of the more costly of the cut glass and crystal being especially worthy of admiration. As to the etched and engraved vases and goblets, on the surface of which are groups of classic figures modeled after the antique, they are entitled to be regarded as works of pure art, and are, indeed, as costly as sculptures in ivory. The cameo glass of Thomas Webb & Sons, consisting of three successive layers of different colors, each of which is cut away to the extent necessary to produce a beautiful pattern combining the whole of them, is of an exquisite character. For splendor of tint the ruby glass, which owes its richness to the large quantity of gold employed in the process of making it, stands almost alone. In the scarabæus ware the sheeny hues of a tropical beetle's wings are imitated with singular success, and the dragon's blood glass is especially notable for its vividness of color. Old ivory is also simulated with deceptive fidelity, as well as bronze and other metals; and the pheasant glass, in which are reproduced the various hues of the plumage of gold, silver, and speckled birds of that family, and the peculiar iridescence of their breast feathers, may be mentioned as one of the novelties of this kind of fictile ware. For the decoration of the table the devices are endless, and most of the ornaments intended to cover the open spaces being composed of silvered glass, the effect, when illuminated by the fairy lamps invented by Webb & Sons, rising out of troughs of cut flowers, is charming in the extreme.

TEXTILE FABRICS.

Among the textile fabrics of Great Britain, the carpets of John Crossley & Sons, of Halifax; of J. Bennre & Co., J. Bristow & Co., and M. W. Whittall & Co., of Kidderminster, occupy a large amount of wall space, and are noticeable for their high quality, and in many instances for the general excellence of their designs, although there is still a clinging on the part of some of the more conservative of the manufacturers to the old-fashioned floral devices of fifty years ago. On the other hand, the more suitable geometrical patterns are being employed with greater freedom and with happy effect, and chemical science is daily supplying the dyers with rich and novel tints, in the blending and contrast of which a fine artistic skill is displayed by the firms enumerated above. That of John Crossley & Sons, employing 5,000 people and turning out 6,000,000 yards of carpeting per annum, claims as

one of its specialties the fabrication of seamless carpets by means of power looms of its own invention. Messrs. Cooke & Sons, of Liversedge, Yorkshire, are also large exhibitors, their productions comprising Turkey carpets closely resembling the genuine article; Anglo-Indian carpets, which are said to combine the softness of the Wilton pile with the wear of the best Brussels and at a considerably less cost; a "royal Axminster fabric," intended as an inexpensive substitute for the costly seamless Axminster; and a Balmoral, which is a novelty in its way, and is midway in quality between a tapestry and a Brussels carpet. Of floor-cloths there is an endless variety, linoleum predominating; and it is worthy of remark that most of these as well as of the carpets were bought up by the local furnishing houses and dry-goods stores within a few weeks after the opening of the Exhibition. I do not think, from all I can learn, that this was done so much for the replenishment of stocks as because the retail traders in Melbourne did not wish their customers to learn what are the wholesale prices of these fabrics and what are the profits ordinarily charged upon them.

LANCASHIRE SECTION.

A particularly noteworthy feature in the English Court is the Lancashire industrial section, where are collected together representative goods of a class which can not be found in any other court whatever, arranged and displayed with consummate taste and judgment.

Naturally cotton goods in every possible variety predominate, but there are also extensive exhibits of silks and velvets, furnishings, chemicals, and India-rubber ware of all kinds. The firm of Richard Haworth & Co., of Manchester, is a leading cotton-spinning establishment, and it has here a large and representative exhibit. In this factory, which is, perhaps, as complete as any in the world, there are 175,000 spindles and 3,500 looms, and upwards of 4,000 work people are continuously employed. Annually, five or six thousand tons of cotton are imported from the United States—mostly from New Orleans—which the firm weaves yearly into 34,000,000 yards of cloth. The exhibit in question comprises a large collection of white calicoes, flannel cloth, velveteens, printed cotton shirtings, tailors' and dress-makers' linings, and plain, woven, single, and reversible art blinds. The various processes and apparatus of cotton spinning and weaving are amply and interestingly illustrated from the beginning with the very raw material to the finished lap, and then the four "drawings," the card sliver, cotton staples, slubbing, intermediate, roving, jack-bobbins, spindles, flyers and weavers, dyed yarns, ball warps, beam sections, etc., ending with a model loom, showing the woven material as it leaves the machine. Yarns are also exhibited in various degrees of fineness down to that delicate material spun from the longest fibers, known as Sea Island cottons, principally grown in the Southern States, and the yarn manufactured from which is so finely attenuated as to require a length of 168,000

yards to the pound. Messrs. Edmund Potter & Co., also of Manchester, by some choice exhibits, illustrate the degree of perfection to which the art of engraving, painting, and printing on cotton, calico, and woolen goods has attained by means of artistic minds and elaborate machinery. The higher branch of the designer's work is shown in two specimens by Mr. Walter Crane—the Empire border; a border of figures in harmonious colors representative of the extent of the Empire of England and her dependencies; and the fifty years costumes, showing the prevailing fashions in each year in the half century's reign of Queen Victoria. Besides these there are striking designs on cotton sateens; a fine imitation of woolen material called the "lamette cloth," the delicate texture of which renders it specially suited for tennis, sea-side, and general outside wear; fine crape material; drillettes, and a new and serviceable class of prints in indigo blue on delicate grounds of the same color, the recommendations of which are its durability and its greater fastness, both in washing and sunlight, than is the attribute of any other product. But though indigo is a favorite color, from its serviceableness, there is no lack of variety in the tints of the pigments also employed, and in the zephyr class of cambric cloths all the fashionable colors—coquelicot, gobelin blue, rose-pink, strawberry, silver gray—occur freely, used with the prettiest effects; while in the matter of design, conventionality is rather conspicuous by its absence, and the eye is continually pleased by novel patterns and graceful ease and freedom of drawing and arrangement. Messrs. Rylands & Sons, Limited, with their seventeen mills in different parts of Lancashire, containing about 200,000 spindles and 5,000 looms, embrace nearly every department of the Manchester trade in their factories, and each establishment is exclusively devoted to a separate branch; superior calicoes for bleaching, twills for finishing, and cloth for printing, being turned out at the rate of 300,000 yards a week from one mill; while at another, 1,500,000 yards of cotton goods are bleached and dyed, etc.

The total number of hands employed is 20,000, and the value of imported cotton averages $250,000 annually. In their exhibit the company show representative products of each of their mills separately, and the collection includes pretty well all the articles for which the Lancashire district is celebrated—gray Dacca calicoes, sheetings, twills, damasks, brocades, sateens, oilcloths (a departure from the stiff, set patterns of which is made in the display of the "Jubilee design," representing in an appropriate manner the chief features of Her Majesty's reign and of the British Empire), regatta, Oxford, Galatea, and other kinds of colored goods; sewing cottons, India tapes, small wares, and, lastly, ready-made clothing, costumes, embroideries, corsets, umbrellas, and mantles. The amalgamated firms of Horrockses, Miller & Co. and Crewdson, Crosses & Co., whose mills are at Dalton and Farnworth, show the long cloths which have rendered their names world-famous. Messrs. Swainson, Birley & Co., of Preston, in addition to the usual

Manchester goods, have an exhibit of plain and fancy muslins and cos tume cloths, and Messrs. Barlow & Jones send an excellent collection o plain and colored table-cloths, quilts of all descriptions, Turkey towel ing, and some specimens of the finer classes of cotton goods. Her again novelty and attractiveness are the leading characteristics of th designs, and artistic taste is frequently conspicuous in patterns an embellishment. Messrs. Burgess, Ledward & Co., of Manchester, hav a large collection of what are known as colored cotton goods, cloths mad from dyed and bleached cotton yarns, and Messrs. Tootal, Broadhurst Lee & Co., of Rumworth, make an extensive display of prints, cretonnes and muslins in new and choice patterns. Although for all practica purposes machinery has abolished hand-knitting, yet every year see an improvement in knitting-machines. Mr. William Harrison, of Man chester, exhibits the most recently perfected instrument of that kind It is attachable to an ordinary table by means of thumb-screws, and i operated on by hand with the assistance of a crank, and for simplicit of construction, ease of working, and rapidity of operation holds an un rivaled position. The work it produces at the rate of four or fiv thousand loops a minute, or a yard of plain work in ten minutes, and completed pair of socks in twenty, exactly resembles hand-knit work and can be darned and repaired in the same way. The staple industr of Leek, the market town of Staffordshire, and 28 miles distant fro Manchester, is the manufacture of sewing silks, silk velvets and trim mings, and silk dyeing and printing, in which 5,000 of the inhabitant are engaged, and Thomas Wardle, F. C. S., one of the leading manu facturers, exhibits some excellent samples of art printing on silk plus and velvet as well as on satin and cretonne. The dyes used hav reached a degree of perfection nowhere else attained, are of purely a tistic tone and great durability, and the patterns they elaborate are bol and vigorous, some suggestions for the designs being even taken fro the palaces and temples of India. The resisting colors are fast an what is termed "Eastern" to mark them as distinct from the more bri liant but also more evanescent aniline dyes, and to give the fabrics really artistic light and shade Mr. Wardle prints with the hand-block instead of the monotonous rolling gear. Each color in this process ha to be laid on separately, and as the pressure is not automatically exac there is a pleasing variety in the disposition of light and shade. Mr. S Gibson exhibits a case of silk, both raw and in the manufactured stat and Messrs. Briggs & Co., of Manchester, send a large collection of em broideries, embroidery and sewing silks.

RUBBER GOODS.

There are three large exhibits of India-rubber goods from the Lan cashire factories. Messrs. David Moseley & Sons, of Ardwick, Man chester, show water-proof clothing, in respect of which a marvelou advancement has been made in recent years, especially in the matters o

designs and colorings, and among the exhibits of this firm is one illustrative of a patent they possess for getting over the long-experienced difficulty of making the rubbers take colors. It is a process whereby the rubber is spread over the cloth and the pattern is printed on the rubber itself. The same firm also shows its new manufacture, the "Coruscus" cloths, the patterns on which are much superior to the old checks and stripes. There are also rubber mats, railway buffers, bearing springs, etc., showing the variety of new uses to which the material has been successfully adapted, as well as the usual ware, gauntlets, "anchor" hose for firemen, pipings, leggings, balls, beltings, etc. The exhibits of Messrs. Mackintosh & Co. and Broadhurst & Co. are of the same class and variety, with the addition of surgical appliances, clothing, and vulcanized India-rubber.

LOCKS.

The Chubb Lock & Safe Company, Limited, send a collection of locks for every conceivable purpose, from the huge church lock mounted in oak to the most delicate contrivance for securing a lady's escritoire.

The newest patent of the company is a lock for bankers' safes, which contains a novel mechanical movement, by means of which the "tumblers" are automatically fixed before it is possible to withdraw the bolt, and are practically never in direct contact with the bolt itself. These locks are never sold to the general public. The same famous company show their fire and burglar resisting safes and strong-rooms in great variety, and an instructive interest is lent to the exhibit from some of the collection having false and movable backs or fronts, so that it is possible to minutely examine the mechanism of the locks and the composition of the safes. Messrs. John Walker & Worsey, of Birmingham, and Cyrus Price & Co., of Wolverhampton, are also large exhibitors of "Triumph" safes and locks and "Eclipse" and "Conqueror" safes, strong-rooms, fire-proof doors, bank locks, and night-latches.

MUSICAL INSTRUMENTS.

Messrs. Boosey & Co., the well-known manufacturers and music publishers of London, make an excellent display of military band and orchestral instruments of varied shapes, substance, and quality, the exhibits in many instances being remarkable for ingenious mechanical contrivances of an unusual character. In this regard particular mention is merited by an improvement this firm has patented in connection with some brass wind instruments. This is what is called a "compensating piston," an arrangement of the piston action by means of which it is claimed the inaccuracy of intonation necessarily existing in certain notes on all valved instruments (whether with the piston or cylinder action) is corrected. Composers for military bands have hitherto felt themselves constrained to avoid certain keys in which at least a couple of notes, with their unharmonic changes, occur, owing to such notes,

fingered with all three valves, being very sharp, and by the improvement referred to that defect is remedied, while the weight of the instrument is not increased and the arrangement is so simple that it can not get out of order. The innovation principally consists in novel adjustments of the tubing connected with the third valve, which is so disposed as to bring into action extra tubing fitted to the first and second valves, when the third is used in combination with them, and the result is accomplished without adding a single new moving part to the valve action or altering the established system of fingering. A modification of the principle is applied to four-valve instruments, and is specially required on the euphonium, which is, by its means, perfected throughout the whole of its compass. This instrument, the euphonium, is the modern substitute for the now almost obsolete "serpent" and ophicleide, and is marked by clear and powerful tones and peculiar adaptability for solo purposes. Bombardons, the lowest toned of brass instruments, are also shown, and their construction draws attention to the great variety of inclination now given to the bell-ends for players who are mounted as well as those on foot. In the case of the bombardons, the bell-ends are convoluted so that they pass over the performer's shoulder. There is a glittering array of trombones, bass and tenor, and alto instruments with pistons, the highest development yet obtained in their manufacture; contra-basses and circular basses; horns illustrating every variety of form in which that valuable instrument is made; cornets and soprano cornets, trumpets, bugles, and ballad horns. And in respect of all these it is noteworthy that while their musical value is, of course, the first consideration, yet their external adornment is not neglected, some of the many instruments being highly artistic in point of rich chasings, graceful stampings, and light, neat, and pretty outlines and designs.

Reed instruments are represented by flutes of various materials and mechanisms—cocoa-wood to silver—and from those with only a few keys to others framed on the latest elaborations of the Boehm principle.

Among these instruments are flutes, piccolos, clarionets, oboes, and bassoons of ebonite, richly mounted, delicately or gracefully shaped, finely finished and replete with every modern appliance to insure correctness of fingering, but the especial recommendation of which is the material of which they are manufactured. It is claimed for ebonite that it can not possibly split, and instruments made of it will readily stand every variety and extremity of climate.

WATCHES AND JEWELRY.

There are only two notable exhibits of watches and precious stones, and, singularly enough, the latter exhibit consists almost wholly of a fine collection of Queensland opals, black, green, white, "fire" and "honey" gems, set in a variety of tasteful forms, and associated happily with diamonds and other brilliants by H. N. Barbe Moore, of Lon-

don. The opals come from the mines owned by Mr. Herbert Bond, near Cooper's Creek, Queensland, and this particular collection has been pronounced by competent judges in England, as well as here, to be the finest ever gathered together, and certainly goes to sustain the position that the finest opals in the world are now being supplied by Australia.

The most remarkable specimen in the exhibit is a magnificent stone weighing 40 carats, of exquisite coloring, and richly set with handsome diamonds. The only exhibit of English watches comes from Rotherham & Sons, of London and Coventry, the one English manufacturing firm which has conspicuously adopted American principles, while not wholly discarding the older method of handwork. This firm was the first, as it is now the largest, manufacturing establishment to introduce extensive machinery in watch-making, and if the idea promulgated in Switzerland and developed to its zenith in the United States, has not been improved upon in the Coventry work-shops to any appreciable extent, yet its introduction has tended to break down the barrier of costliness reared between English and American manufactures and place competition on a more common footing. The force of a new example in removing even popular prejudices and old established customs is displayed here in the fact that of the ninety-six gold and twenty-four silver watches shown by this firm, more than two-thirds are keyless and constructed in consonance with the mechanical designs in vogue in American factories. In the keyless watches the latest systems of setting the hands is generally adopted. Both hands are adjusted by pressing a pin on the outside of the case, instead of the now usual method of shifting a small lever under the bevel, or pulling out the winding knob, a neat, expeditious, and convenient arrangement, having many strong recommendations to approval.

CUTLERY.

The celebrated cutlery firm of Joseph Rodgers & Sons, of Sheffield, who employ 2,000 hands, maintain their prestige by a well chosen and well displayed assortment of their wares, the chief novelties in which are the "Jubilee Knife," a formidable weapon and an excellent sample of the cutler's art, containing fifty different implements, and the patent bifurcated carving-fork-guard, to use which, instead of lifting the guard, it is moved from right to left, or *vice versa*, and which is claimed to be simple and to give perfect security to the person using it.

PLATE WARE.

Messrs. Shaw & Fisher, manufacturers of silver, electro-plate, and Britannia metal, show a large collection of glass and plated ware of all kinds; and another large exhibit is that from the Aluminium Company, Limited, the proprietors and manufacturers of Webster's Patent Crown Metals. The works of this company are the only ones of their

kind in Great Britain which are actually engaged in producing alu nium, and the exhibit under notice shows that the metal is being e tensively utilized in the manufacture of a great variety of artic Bright silver in color, it is admirably adapted to the making of ta cutlery, and it is said to be as strong as ordinary steel, and as eas cleaned; while being of the same color throughout it does not get d colored by use, and the necessity of replating is entirely obviated. is also made into swords and helmets, bits, harness and carriage f tings, boat and ship furniture, and small ornamental articles, such match-boxes, pencil cases, and cigarette cases. This company al manufactures a particular kind of bronze, which, being less easily i jured than the ordinary composition by atmospheric conditions, claimed to be better suited for artistic use.

The Potosi Silver Company, of Birmingham, has a couple of cas containing numerous specimens of the metal, the manufacture which is a specialty of the company, and which they claim to be, as substitute for electro-plate, superior to other white metals, such nickel, Britannia metal, or German silver, from its being bright in a pearance and retaining its color pure and untarnished throughou The new composition has hitherto been almost exclusively used making spoons and forks, but it has now been found adaptable to t manufacture of other articles of table use and ornament, and hen such requisites are being extensively made up.

Messrs. Walker & Hall, of Sheffield, in addition to a large display nickel, electro-plate, and glassware, exhibit as novelties, first an ind structible non-conductor for fitting to tea and coffee pots, which is handle perforated at each end near the point of contact with the ves and superior to ordinary non-conductors of ivory, bone, or pearl, in th it is not so liable to be broken; and second, a fine collection of for and spoons of "Sonora" silver, another material having the reco mendations of durability and retaining its whiteness and brilliancy color.

Messrs. Boardman & Glossop, of Sheffield, are among the largest e hibitors of electro-plated ware, their goods being particularly rema able for the originality and artistic taste of the designs.

MISCELLANEOUS.

The exhibits of wire and hemp rope from the amalgamated firms Dixon & Corbett and R. S. Newall & Co., Limited, of Gateshead-o Tyne, are noticeable for some novel features in their joint manufactur The patent galvanized flexible steel wire ropes, for towing and hoisti purposes, are constructed specially on a double purchase stone win and have the advantages of occupying a very limited space as co pared with a hempen rope of equal strength, being only 2½ inches in c cumference, and of having a guarantied breaking strain of 12½ tons, equal to a hempen rope of 8 inches in circumference. Only one-thi

the weight of the other, this rope has increased pliability and less tendency to kink, from the fact that it is composed of alternate right and left twisted or compensating strands. These firms also show Lang's patent construction of rope, the feature of which is that the strands, being twisted in the same direction as the rope, there is a much longer surface of wire to the action of friction before the locking of the wires takes place, and much greater freedom to permit of displacement due to the action of the rope being bent round drums and pulleys. There is consequent on this a large increase in the duration of the rope, as the wires do not break until they become too weak for their own work. Messrs. John Stephen & Sons, of Falmouth, display coils of tarred Russian hemp rope and of white manilla very finely spun, and a variety of wire rope and hawsers, with some specimens of submarine electric telegraph cables.

Messrs. Henry Millward & Sons, of Redditch, show a large collection of needles and fish-hooks, in the former being conspicuous the calyx-eyed needle, which is so made that the cotton passes through the head, the sides of the eye acting as a spring to keep the cotton fast in it when it has once got there. In this department Messrs W. Bartleet & Sons, of Redditch, are also large exhibitors, sending 4,100 different sorts of needles for hand-sewing, and 126 varieties for machine work, as well as 1,255 different kinds of fish-hooks.

Steel work and edge tools are largely represented by Messrs. Edwin Lewis & Sons, of Wolverhampton, Robert Sorby & Sons, and Wheatman & Smith, of Sheffield, who send good collections of saws of all classes, cooking vessels, sheep-shears, scythes, and other agricultural implements, chisels, hatchets, ax-heads, and coopers', brick-layers', and carpenters' tools of every variety and description.

Several leading British makers contribute to a fine collection of carriages. Among other articles the Windover Company send their canoe-landau, which is fitted with a patent automatic head so perfectly under control by a lever that a lady may raise or lower it with the minimum of exertion, and fitted also with an ingenious door fastening fixed on the inside, which, opening the door, also releases a folding step which then falls into its proper position. American hickory and walnut are the woods which are most extensively used in the construction of these vehicles. Wagonettes are fitted with levers so that the coachman, without leaving his seat, can open or close the rear door; and to others a novel invention is adapted with excellent effect. Should a lady desire to ride on the front seat, instead of risking the dirt and danger of climbing over the front wheel, the seat is made to divide by pressing a spring and allows her easily and comfortably to pass from the rear to the front of the vehicle.

Mr. H. B. Hardt, as agent for over one hundred and fifty British exhibitors, has had a special court assigned to him. Here collections of encaustic titles from Messrs. William Godwin & Sons, of Hereford;

brasswork and castings from Mason & Co., Birmingham; heraldic work and memorial brasses from T. J. Gawthorp, of London; and guns, fowling pieces, and sporting fire-arms from Cogswell & Harrison, of London, are conspicuous among a miscellaneous host of articles of various kinds. The Huddersfield manufacturers have also joined together and sent a collective exhibit of their woolen frabrics, showing 900 samples, all the specimens of cloth being 2½ yards long and so hung as to display the full length of each piece, besides being free to be felt and handled, thus permitting an excellent estimate to be formed of the style and quality of each article.

Messrs. Collard & Collard and J. & J. Hopkinson, both of London, are the chief exhibitors of pianos, the one a firm already well known in Australia, and the latter with a reputation yet to be established there. Both show instruments of extra durability to enable them to withstand sudden changes of climate and in other ways fitted to meet the conditions of their use in the colonies.

The leading booksellers and publishers of England and Scotland send collections of the representative classes of books with which their names are identified, and there are, besides, choice examples of bookbinding and paper-making.

FRANCE.

The French exhibits occupy 50,000 square feet of space, irrespective of that covered by the specimens of Sèvres porcelain, between seventy and eighty in number, which have been sent from the national manufactory, and form a splendid group in one of the art galleries.

The principal entrance gives admission to a spacious pavilion, devoted to the great publishing houses in Paris, who displayed a superb collection of illustrated works, the quality of which is sufficiently attested by such names as Quantin, Plon, Hachette, Firmen Didot, Rouain, and others which appear on the title pages. Among these, the "Grand Dictionnaire" of Larousse, in sixteen volumes, Racinet's "Costume Historique," in five volumes, and the same author's superbly illustrated "Ornement Polychrome," in two volumes, together with the national edition of the works of Victor Hugo, in forty volumes, quarto, splendidly printed and illustrated, may be referred to as altogether *sans pareil.*

EDUCATION.

But the largest and at the same time the most interesting exhibit in the French Court is that of the Minister of Public Instruction, which occupies a space commensurate with its importance and its magnitude. It aptly illustrates also the immense efforts which are being put forward by France to place herself ahead of Germany in point of popular intelligence. Her annual expenditure upon national education, which was only £444,000 before the war, is now £5,340,000; and I gather from

a document placed at my disposal by the gentleman in charge of this department, that during the last seventeen years the French Government has expended the prodigious sum of $270,000,000 in the work of national education. There are 4,662,668 children between the school ages receiving instruction in the primary and maternal schools, in connection with the most of which savings-banks have been established having an aggregate of 484,162 depositors, with $2,500,000 standing to their credit.

To each primary school is also attached a lending library containing an excellent collection of some of the best works in the French language, as also translations from other languages. There are 33,880 of these circulating libraries, numbering a total of 4,759,208 volumes.

Technical education enters largely into the curriculum of the superior primary schools, into which those pupils only are admissible who hold certificates from the schools of a lower grade. The course of instruction comprises applied arithmetic, the elements of algebra and geometry, book-keeping, a knowledge of the physical and natural sciences in their application to agriculture, industry, and sanitation; geometrical and decorative design and modeling; the basis of the common law and political economy; the history of French literature, the principal epochs of general history, and especially of modern times; industrial and commercial geography; the living languages, and working in wood and iron for the boys, with needlework, cutting out and making up garments for the girls.

In the normal schools 8,938 young persons of both sexes are being prepared for the work of teaching. Above these are the 390 national lyceums and commercial colleges, with an aggregate of 100,000 students; and, crowning the scholastic edifice, are the twelve faculties, comprising the Museum of Natural History, the Normal Superior School, the School of Maps, the College of France, the School of Living Oriental Languages, the Practical School of High Studies, the School of Fine Arts, the Polytechnic School, the School of Mines, the School of Roads and Bridges, the Central School of Arts and Manufactures, the Conservatory of Arts and Handicrafts, and the Agronomic Institute. There are, besides, the Schools of Rome and Athens, established for the cultivation of archæological studies. Technical instruction is imparted in seven establishments created by the state, in seventy special schools instituted by local bodies in the country, in four Schools of Art and Handicrafts founded at Aix, Angers, Chalons, and Lille, and in a watch-making school at Cluses.

The many hundreds of exhibits comprised in the French Education Court illustrate every step taken in the work of popular instruction, every process and method employed, all the materials used and most of the results achieved, from the first efforts of the children in the maternal schools up to the statues modeled, the drawings executed, and

the mechanical model machinery and products of handicraft produced by the most advanced pupils in the higher institutions.

I have been much struck with one excellent feature of the system pursued in the normal schools of France, where, as I have said, teachers are being prepared for a professional career; the term of preparation covering a period of three years. In the holiday season it is the duty, and no doubt the pleasure, of these undeveloped school-masters and school-mistresses to make tours either at home or abroad, and to record the results of their observations in manuscript diaries, which are not unfrequently embellished with pen and ink drawings, plans, maps, and designs. Sometimes these excursions are made singly, while at others a party of four or five and twenty, accompanied by one of the directors and four or five of the professors, set out to explore a certain district. Several of these diaries have been brought together by M. Buisson, Inspector-General of Public Instruction, Director of Primary Teaching, and Vice-President of the Committees of Admission to the Universal Exhibition of 1889, who has been selected by the French Government to represent the Minister of Public Instruction and the Fine Arts at this Centennial Exhibition; and very interesting reading I have found some of these documents to be.

Take, for example, the "Cahier de Promenades," made by M. E. Masson, of the Normal School at Auteuil, one of the suburbs of Paris. These took place on Thursdays only, and were of the most varied character. To-day he visits the theater of military operations at Montretout and Buzenval, sketches a map of Paris and its environs, showing the scene of every combat which took place around the capital during the Franco-German war; and next week he explores the Egyptian Museum in the Louvre, sketches the geographical and topographical features of the country in which the more important of the antiquities were found, and describes the principal contents of that valuable collection, following this up with a detailed account and grand plans of the other archæological sections of that magnificent assemblage of historical and artistic relics, as well as of the Museum of Archives, which is lodged in the Hotel de Soubise. In dealing with the latter, he reviews the various materials which have been employed to write upon and glances at the calligraphy, the style of the documents, the method of sealing those of an important public character, and the monograms adopted by the early Frankish kings.

Among the curiosities preserved here are the will of Napoleon and that of Louis XVI, the original Declaration of the Rights of Man, the last letter written by Marie Antoinette, and the keys of many of the dungeons of the Bastille.

A visit to Notre Dame is illustrated by a plan of the city in 430, when it was restricted to the little island in the middle of the Seine; and again in the twelfth century; and a third plan of the choir of the cathedral indicates the position of the principal tombs it contains.

"From grave to gay," is an easy transition, and M. Masson passes from the venerable fane to the Vaudeville Theater, a copious description of the interior of which is preceded by a rapid and succinct narrative of the growth of the theater as an institution; but this is a topic with which it is evident the writer's previous studies have only rendered him partially familiar.

A visit to the Conservatory of Music is next described, and among the treasures preserved in the museum, M. Masson enumerates a violin of rare excellence by Stradiverius, valued at between £600 and £800, harp formerly belonging to Marie Antoinette, Auber's piano-forte, upon which he composed most of his operas, and the bagpipes of Louis XVI, used when he, his queen, and their courtiers used to play at being shepherds and shepherdesses, in the happy days they spent at Le Petit Trianon, before the Revolution had begun to project its awful shadows over their path.

Passing over some interesting particulars concerning what has been and is being done for the decoration of the Pantheon, I arrive at the writer's concise account of his visit to the famous manufactory of tapestry known as "Gobelins," which is comprehensive and complete, and it is easy to see how great must be the value of the information thus acquired.

The commercial schools for boys and girls in Paris appear to be doing excellent work in the way of technical instruction, as is shown by the specimens of the pupils' productions, which consist, in the case of the boys, of architectural and decorative models, carpenters' and joiners' work, turning, metal castings and fittings, and carvings in wood and stone of geometrical figures, and of leaves and fruit from nature. Many of these show an amount of manual dexterity, skill, ingenuity, and careful finish worthy of adults.

The diaries of the male pupils show that they do not limit themselves to one branch of handicraft, but are taught to acquire facility in all. Thus I find one of them recording how he practices modeling on Monday, works at the carpenter's bench on Tuesday, applies himself to the labors of the forge on Wednesday, resumes his modeling on Friday, and returns to carpentry and joinery on Saturday, giving on the margin of his journal pen-and-ink sketches of the articles he has been engaged in fabricating during the week. This variety of occupation and trained capacity not merely prevents the individual from degenerating into a mere human machine, but brings several faculties into simultaneous play, and enables the skilled operative when work is slack in one branch of employment to turn his hands to another, and thus avoid the enforced idleness which he might otherwise have to undergo.

Equally practical is the system of instruction pursued in the commercial school for girls, commencing with the simplest operations of the needle, passing on to mending and embroidery, measurements, tracing of patterns, cutting out, designs, and the fabrication of every article of feminine wearing apparel.

To this succeeds the superior course in which domestic economy and hygiene are taught in all their details. When one reads the following list of subjects taught in these schools, one begins to understand in part why a French woman is, as a general rule, so good a household manager and contrives to combine elegance with economy in her ménage:

The duties of a housewife, qualities of a good manager, order, economy, cleanliness, vigilance, household expenditure, daily entries, balance, equilibrium of receipts and disbursements, inventory of the furniture, rent, rates, and taxes. In the second half-year the pupils are instructed as to the selection and preservation of furniture, the distribution of the housework, daily, weekly, and in each season of the year, bed-making, sweeping and dusting, kitchen furniture and utensils, and the various kinds of cooking stoves.

Concurrently with these teachings hygienic lessons are given with respect to the selection of a house, as regards soil, aspect, and salubrity, ventilation, lighting, and heating, the properties of different kinds of fuel, precautions to be taken in the use of gas and oil as illuminants, the influence of these upon the sight, and the selection and fabrication of wearing apparel, from a hygienic point of view.

PORCELAIN.

The great porcelain industry at Limoges is represented by a choice and varied display of ceramic fabrics from the factories of W. Guerin and Co., G. Demartral & Co., and H. Boudet; but it is greatly to be regretted that only a few specimens of the admirable productions for which Messrs. Haviland & Co., have acquired such a wide-spread renown, have been exhibited, and these only through a local agent. Those who know, as most Americans do, the high state of perfection which has been reached by the brittle products of the last-named firm, will feel that no display of Limoges ware could be regarded as complete which does not include examples, not only of the Haviland faience, but of the pâte tendre, the egg-shell china, and the exquisite enamels which are issued from this house, and are, in many instances, of such an exceptionally high quality as to find a place in museums and to be eagerly sought after by collectors.

MISCELLANEOUS.

Some beautiful stained-glass windows, by Handecœur and Colpaerd, of Lille, and a small exhibit of crystal glass from the famous Baccarat factories, constitute but an indifferent display of articles to illustrate a branch of art manufacture in which France excels. But as to what are known as "Articles de Paris," there is quite a superabundance, as also of marble clocks and chimney garniture. Six rooms are occupied by suits of furniture from the work-shops of firms belonging to the "Chambre Syndicale de l'Ameublement," and some of these in the style of the Louis Quatorze period, richly carved and gilt, and upholstered with Beauvais tapestry, are not unworthy to have found a place in the salons of Versailles when it was the residence of Le Roi Soleil.

French taste and elegance are further exemplified in the costumes, mantles, gloves, boots, fans, etc., exhibited by the Chambre Syndicale des Confections, in Paris; nor would it be right to allow the marvelous collection of skillfully modeled and daintily dressed dolls and mechanical figures to pass unregarded, for these are certainly unique of their kind.

Among the alimentary products exhibited in the French Court, preserved meats, truffles, mushrooms, game, fish, foie gras, fruit, and vegetables occupy a prominent place; although to send these things out to countries in which most of them abound and where some of them are articles of export, is like sending coals to Newcastle.

And the same applies to olive oil from Provence and Algeria; inasmuch as equally good oil is being produced in South Australia.

WINES.

Of brandy, liqueurs, absinthe, malt liquors, champagne and every description of French wine, the exhibits are exceedingly numerous; and great ingenuity has been displayed in the way of designing and constructing trophies, one of these being modeled after the famous Tower of Eiffel. In Australia, as in most prosperous countries, the consumption of sparkling wines from the French vineyards—or from European manufactories in which those articles are skillfully simulated by the aid of chemical science—is very large in proportion to the population; and competition for the Australian trade is extremely keen among the great champagne houses in France. Hitherto, the vine growers of this part of the world have not succeeded in producing a *vin mousseux* like that of Epernay and Reims; and until they do colonists will go on paying ten or twelve shillings a bottle for the imported article. But the clarets, burgundies, hermitages, and sauvignons which were formerly drawn from France, as also the hocks and other wines of the German Rhineland, are being rapidly replaced by similar beverages produced in Australian vineyards; so that in the near future it is not at all improbable that these colonies will suffice for themselves as wine-producing countries, and will be equally independent of the Old World for their supply of cognac, the consumption of which has undergone an extraordinary diminution of late years, partly owing to the superior popularity of whisky, and partly to the more temperate habits of the people.

GERMANY.

Ever since the close of the Franco-German war the external policy of Germany has been steadily directed to two objects, *inter alia*, the foundation of German colonies in the South Pacific and the extension of German trade with the British colonies, which contain 42,200 natives of Germany, irrespective of a large number of persons who are German by descent.

In the prosecution of these objects the Government has established and liberally subsidizes a monthly line of mail steamers between Hamburg and Melbourne, and from thence to Samoa; and in the Exhibitions held here, both in 1880 and 1888, no expense was spared to make an impressive display of German products and manufactures. On the present occasion the German Court is the second largest in the building, and a skillful architect was sent out from Berlin for the purpose of decorating it with such trophies and embellishments, including triumphal arches and gonfalons, colossal busts of the three emperors, and an imposing statue of Germany, typified as a female figure surmounting the globe, as would be calculated to convey to the minds of visitors a vivid idea of the power and importance of the resuscitated empire.

PORCELAIN.

There are in all 1,175 exhibits in this section, and one of the most striking displays it contains is that of ceramic works from the Royal Porcelain Manufactory in Berlin. This includes some gigantic vases, rivaling in material, form, and decoration the choicest productions of Sèvres. Most of these have been purchased by a single collector. The smaller exhibits partake of the general characteristics of the Dresden and Meissen wares, with which the American people are sufficiently familiar. From Saxe-Meiningen has been sent a choice collection of figures in porcelain; while the majolica ware and caustic tiles manufactured in Magdeburg are entitled to special mention on account of the good quality of the material of which they are composed.

MISCELLANEOUS.

The collective exhibit of the Berlin Union of Manufacturers makes a very effective display, partly on account of its variety and partly on that of its skillful arrangement. It is so multifarious in character that I must content myself with glancing at such of the articles as arrest the attention either by their novelty or by their superior quality. Such are the tapestry curtains, shawls, and rugs of G. Paatz & Co., of Pelsnitz; the dyed-wood veneers of W. Auffermann, of Berlin, which only an expert could distinguish from the black-pear tree; the maple and other furniture woods, so accurately imitated; the artists' colors and drawing utensils prepared by G. Bormann, of Berlin; the lead and colored pencils manufactured by the well-known house of Johann Faber, of Nuremberg; the rich looking gold, silver, tin-foil, and other papers made by Leo Haeule, of Munich; the samples of imitation marble and wood, ingeniously produced on pasteboard by means of transfer graining sheet, from George Grossheim, of Elberfeld; the portable telegraphic apparatus for railways, of the Brothers Naglo, of Berlin; the paper-stucco decorations, applicable to interiors, manufactured by B. Schmidtman, of Leipsic; and the remarkably cheap articles of industrial art in bronze, produced by castings or stamping, which approach

so nearly the genuine works of art they are copied from as to enable persons of small means to gratify their tastes by an insignificant outlay.

Four Berlin houses are engaged in the production of these, and of metallic ornaments for book-covers, picture-frames, ink-stands, and knick-knacks innumerable. Another exhibitor, L. Leichner, of the same place, admits all and sundry into the dressing-room of the actress or of the professional beauty whose charms are on the wane, by displaying all the toilet requisites, such as paints, powders, puffs, and perfumes, with the means of dexterously applying them, which art and science have combined to place at the disposal of the fair sex, and of the fabricators of artificial complexions generally.

The textile fabrics of Saxony, as well as of other parts of Germany, but of the former more particularly, are conspicuously en évidence; the finer varieties of woolen goods showing that the Saxon fleeces have not deteriorated by lapse of time, and that the manufacturers are prepared to enter into a vigorous competition with those of Great Britain in the outside markets of the world. The woolen dress goods, cashmeres, worsted fabrics, tweeds, flannels, hosiery, and under-clothing appear to combine cheapness with serviceableness, and the dyes used testify to the success with which chemical researches are pursued, in the interests of industrial enterprise, by the scientists of Germany.

I may also add, in connection herewith, that chemical and pharmaceutical products form an important item in the exhibits of the German Court. These comprise essential oils and essences in great variety, glue made from leather only, mineral and silicate colors, volatile oils, natural mineral waters, black and colored printing and lithographic inks, bronze-powders, crystals and alkalies, homeopathic preparations, and chemical products for scientific, medical, and photographic use.

And this reminds me to mention the exceptional merit of many, if not most, of the photographs and photogravures executed in Germany, in rivalry with similar productions on the other side of the Rhine.

Those of the Photographic Company, of Berlin, of E. Bieber, of Hamburg, of Joseph Albert, and of F. Muller, both of Munich, of O. Anschutz, of Lissa, Posen, and of W. Fechner, of Berlin, combine in an eminent degree the qualities of accurate definition, gradation of tone, sharpness, and clearness and general harmony of arrangement.

Conspicuous among these exhibits is a series of views of the interiors of the palaces erected by the late King of Bavaria, and printed by a new process—the Albertotype—upon a specially prepared paper which renders them unalterable. The process has been invented by, and is the property of, the house of Joseph Albert in Munich, and prefers a strong claim upon one's admiration.

In metal ware, the most striking exhibit is that of H. Seitz, of Munich. It consists of hard-made articles of copper and silver, of a highly artistic character, both for use and ornament, the whole of them be-

longing to what is known as repoussé work, and the forms and decorations borrowed from mediæval models.

As imitation has been defined to be the sincerest form of flattery, I suppose the clock-makers in the United States should feel flattered by the attempt of the Hamburg American Clock Company at Schramberg to copy their productions, but on examination the cases prove to be slighter and the works less substantial. Some electric clocks, manufactured at Bremen, are regulated by torsion pendulums, impelled by a weight which is wound up at short intervals by an electro-magnet worked by a galvanic battery. The clocks exhibited by Etzolo and Popitz, of Leipsic, are noticeable on account of their beautiful cases of ebony or walnut, inlaid with elegant designs in metal.

Considerable prominence is given to a branch of industry which we have long looked upon as peculiarly American. This is the manufacture of sewing-machines by Wertheim, of Frankfort-on-the-Main, who has established a branch house in Melbourne, managed by his son-in-law, Mr. Hugo Wertheim, who is also an importer of the Hapsburg pianos. At the present time it will interest Americans to know that the lion's share of the sewing-machines, in so far as the colony of Victoria is concerned, is engrossed by this German house, which received during the years 1885, 1886, and 1887 no less than 29,700 of these machines; the imports of them by the next largest importers during the same period not having exceeded 13,000. Mr. Wertheim furnishes employment in these colonies to one thousand persons, who are chiefly engaged in unpacking, putting together, repacking, and repairing sewing-machines, pianos, washing-machines, and wringers. Twenty years ago, I am informed, the Singer sewing-machines commanded almost a monopoly of the Australian market.

Nearly eighty manufacturers of piano-fortes in various parts of Germany are represented by examples of their work, from the diminutive "Mignon" to the grand piano constructed for concert purposes. For many years past Germany has engrossed a large share of the trade with the Australian colonies in these instruments; partly on account of the cheapness of skilled labor in Prussia, Saxony, and Bavaria, and partly because makers in those countries have paid special attention to the exigencies of the Australian climate and have made allowance accordingly for the contraction of the wood and metal, which takes place during the heated term, especially in wooden houses.

Among the working classes, in Victoria more particularly, a piano is almost as customary a piece of furniture as a sewing machine; and too frequently there is a marked preference for the former over the latter on the part of the daughters of the bread-winner of the household. Hence musical instruments figure largely among the annual imports, and this colony, with its population of one million, expends £120,000 in the purchase of pianos, organs, etc. Those of Lippe & Son, Bechstein, Bluthner, and Kaps seem to be most in favor with purchasers of the *choicer varieties.*

Germany is also the largest of the foreign exhibitors of furniture; chiefly in oak and walnut, sound and honest in workmanship and excellent in material, but somewhat heavy in design, owing to a recurrence to mediæval patterns and models on the part of the makers.

The dining, drawing, bed-room and library suites of J. C. Pfaff and C. Praechtel, both of Berlin, have excited much admiration; and an ebony table with ivory inlaid work in the style of the Italian Renaissance, designed by Professor Krumbholz and executed by O. B. Friedrich, of Dresden, is quite unique in its beauty.

Dining tables, in which the extra leaves are placed underneath and rise into their places by an ingenious system of automatic hinges, and chairs with self-adjusting backs, are novelties which have not been overlooked by local cabinet-makers, by whom an International Exhibition is looked upon as a place in which ideas may be picked up and appropriated.

AUSTRO-HUNGARY.

One of the brightest features of the Austro-Hungarian Court is the brilliant display of what is commonly known as Bohemian glass.

Placed at the intersection of two of the main avenues, the Austro-Hungarian Court occupies a very advantageous position, and the best of that position has been made for the display of the most beautiful and attractive exhibits in the court. For there, arranged upon either glass covered tables, which serve to show off the glittering ware with redoubled brilliancy, or on tastefully-draped stands, which enhance the beauty of the articles displayed by means of happy reliefs and contrasts, are the exhibits of Ludwig Moser, of Carlsbad, of Count Harrach, of Neuwelt, Gurtler & Sons, of Meistersdorf, in cut glass, and A. Stellmacher, of Teplitz-Turn, in porcelain and china-ware.

The extent to which the manufacture of the pretty ware first mentioned is carried on in Austro-Hungary is indicated by the fact that in that state there are upwards of two hundred glass factories, most of which are situated in the Bohemian provinces, and the annual value of the productions in this department of industry is estimated at over two millions sterling. In one of the leading houses, that of Herr Moser, above mentioned, there are over four hundred hands employed, and yet in spite of their being kept at work continuously, night and day, the proprietor finds it impossible to keep pace with the demands for the delicate and beautiful products of his ateliers. And an examination of the handsome and costly ware renders it in no way surprising that it should be in such request, even without taking into consideration a potent factor in such popularity, its fashionableness. Favored by kings, it is naturally adored by commoners.

"These are the costly trifles that we buy,
Urged by the strong demands of vanity."

Among the choicest specimens shown in this fine collection are copies of pieces in the table service, in silver and gold enameling, for sixty guests, supplied at a cost of £2,000 to the King of Holland; also replicas of a wine service of ruby on crystal, ornamented richly with fine gold, and purchased by the Czar of Russia for the modest price of £3,800, and of another set bought at a similar figure for presentation to the Crown Prince of Austria on the occasion of his marriage. In all these, and in the large majority of the exhibits, the leading tint is a delicate ruby, the secret of discovering which is another of the many triumphs of ceramic experiment at the Potsdam glass factory, Prussia, where it was found by Kunckel, the then director, so far back as 1679, though its present perfection is the glory alone of the Bohemian workshops. Other beautiful pigments used are amber, turquoise, and azure blue. Pure gold enters largely into the composition of the admixture resulting in the ruby color, and the liberal use of the precious metal, of 15 carat fineness, is one of the main reasons why even the smallest articles are costly in price, while the larger become more expensive still from the same cause, added to the risks run in the process of modeling, firing, and general manufacture. Floral designs, representations of fruit and flowers, and golden scroll-work are the commonest ornamentations, and they are imposed upon the glass by a delicate method of enameling, the artistic treatment being perfect.

There are sets of wine glasses shown in a rich amber appropriately decorated with bunches of happily colored grapes; massive vases in delicately shaded colors and ornamented with pears, apples, and cherries; card-baskets, cups, jewel-caskets, scent bottles, flower stands, and powder boxes, all decorated with the same faultless taste, and with a variety of design which seems practically inexhaustible. The exhibits sent by Count Harrach, a Bohemian nobleman who conducts a vast factory almost solely from philanthropic motives, comprise chiefly vases of opaque glass in many colors, but so fashioned as to be mistakable in several cases for porcelain. Much of the ware is hand painted, and decorated with views in the Watteau style. Gurtler & Sons show how rapidly Bohemia is advancing into rivalry with England in the production of cut glass of the finer descriptions, and a specialty in the exhibit is that peculiar crackled glass, which receives its thousands of minute fractures by the act of passing the material straight from the firing furnaces into ice-cold water and thence back again into the fire.

Schrieber & Nephews, of Vienna, also show cut ware and colored glass, the gems of the collection being articles of a lovely aquamarine tint, and crystal goods ornamented with white enameling, very closely resembling ivory.

H. Wagner, of Ulrichsthal, makes a pretty display of cameo and inlaid work. The exhibits of pottery in this court are remarkable rather for their extreme cheapness than for any artistic charm. Thus, A. Stellmacher, of Teplitz-Turn, Bohemia, has a stand which attracts

attention from the extraordinary reproductions of fantastical forms. There are jugs and vases ornamented with life-size frogs and fishes, and with griffins and dragons, octopi and various reptiles frequently serving as grotesque handles; and one jug in particular bears for such a use a huge pair of griffins as large as the vessel itself, which, with distended wings, forms certainly a more curious than attractive object.

The same factory also sends some clever imitation ivory, and J. Steidl, of Vienna, completes the list of noteworthy exhibits with some interesting examples of glazed pottery and works in enameled lava.

The prevailing scantiness of exhibits in the more general departments of industry, as far as Austro-Hungary is concerned, is attributed to the fact that the commercial results to the country from the last Exhibition in Melbourne were not commensurate with the manufacturers' expectations, and hence, finding no business profit accruing, the expense of exhibiting on this occasion has been reduced to a minimum. But an exception has been made in respect of Viennese furniture. The trade with these colonies in that commodity, which can be dated from the Exhibition of 1880, has reached very extensive proportions at the present time, and it was therefore only to be expected that special efforts would be made now by the manufacturers to keep in touch with their swelling clientele and show what is being done in the direction of improvements in this department. Two firms conspicuously seek to maintain a well-earned prestige in this regard—Thouet Bros., and J. & J. Kohn, both of Vienna. The lightness, handiness, durability, and cheapness of the bent-wood furniture manufactured by these houses alike commend it to the residents in warm latitudes, and now that the upholsterer's aid has been successfully invoked to render the articles ornamental and even handsome, as well as comfortable, without sacrificing the invaluable characteristics of coolness and lightness, the chances are that they will steadily displace the heavier suites of oak and mahogany, burdensomely warm with the wealth of rep and leathers.

Messrs. Thouet Bros., who display quite a mint of gold, silver, and bronze medals, show some 107 pieces of furniture, marked by excellent finish and neatness, and ingenuity of construction, and further illustrating the fact that the material itself can be so cleverly treated and so dexterously upholstered that some really desperate risks can be safely run. Without in any way having the appearance of warmth beyond comfort or heaviness, there are occasional drawing-room chairs with artistic coverings in raised plush, arm-chairs of distinctly gothic forms, settees of antique pattern, chairs upholstered in raised leather of handsome designs, and easels, and children's furniture.

Messrs. J. & J. Kohn, who have several factories in Austria, the principal being in Peschen, employ between four thousand and five thousand hands, and out of the 75,000 cubic meters of wood annually passing through their great workshops they manufacture in the year

the astonishing total of 700,000 pieces of all kinds of furniture, representing an average value of nearly three-quarters of a million sterling. The exhibits from this firm, who, of course, enjoy only a portion of the trade, the immense extent of which is suggested by the above figures, comprise a splendid collection of chairs, lounges, and tables of all kinds, flower, hat, and umbrella stands, artists' easels, and piano stools. Some of the articles are richly upholstered in dark crimson, scarlet satin, green plush, and even tapestry and morocco, and among novelties are a rocking-chair to accommodate twins, another with a sliding foot-rail, and a cleverly devised child's chair with a sun-shade and dining board which can, at will, be altogether transformed into a perambulator.

The wine industry of Austria is regrettably most indifferently represented, less than a dozen growers having deemed it worth their while to exhibit at all and even then not worthily. The position of affairs, to tell the truth, is even worse still than that, for not only are the bottles empty, they are actually uncorked and innocent of any attempt to conceal their emptiness by any of the usual little deceptive wiles, and there is a feeling of something more than bitter disappointment when one encounters bottles labeled "Gumbolds-kirchner 1834," and, anticipating a rare old vintage, proceeds to its nearer acquaintance only to learn that the wine has been left back at Vienna.

The most conspicuous exhibit of beers is sent by the Anton Breher breweries, about the largest in the vicinity of Vienna, and there are besides exhibits of sparkling and still wines from Styria, and liquors of various sorts from Dalmatia, Bohemia, Moravia, and Austrian Silesia.

A graceful compliment has been paid to Australia in this, its centennial year, by the Tyrolese Stained Glass Works, of Musbruck, the capital of the Tyrol. The authorities have sent out a large window, in which Victoria (Australia altogether being probably intended) is represented as a young maiden with the world at her feet. The border is of scroll work, flowers, and ferns, among which are emblazoned the names of the most conspicuous navigators and explorers associated with the history and development of the continent, and the whole work is executed with high artistic taste. The same firm also send another window having as its subject "Joseph established by Pharaoh as Master of the land of Egypt," equally admirably executed.

The brothers Redlhammer, of Gablonz, Bohemia, show a large collection of glass cutters and an exhibit of imitation diamonds and precious stones, which require the most careful scrutiny in order to ascertain that they are not real gems. In the Western Avenue is a fine collection of Austrian garnets prettily set in brooches, pins, bracelets, necklets, and various adornments for the hair. An excellent exhibit among the hardware is that of the Hombak & Marienthal Industrial Association, one of the most prominent of the numerous co-operative organizations

which exist among the Moravian poorer classes. It comprises a collection of nails and tacks used by boot-makers, saddlers, and upholsterers, and is particularly remarkable for the taste and skill with which it is arranged. Divided into panels, the case is then filled with geometrical designs formed of tacks and nails of all sizes and colors.

The great paper-manufacturing industry of Austria, in which a large export trade is done, is amply illustrated. The Leykam Josefsthal Paper-making Company, of Vienna, who keep ten machines at work, annually producing 8,500 tons, the greater part of the raw material of which consists of wood pulp, 2,300 tons, with 1,800 tons of straw pulp, and 1,600 tons of sulphite pulp, being annually used, send a large case full of samples of post, writing, and other kinds of superfine paper, printing, account-book, and blotting papers, lithographic papers, and drawing and card boards. The pasteboard disks upon which the Morse telegraphic instrument tapes are wound is a great specialty of this firm, and hundreds of them are daily sent all over the world. Miles of the printing paper in rolls used on the Webb machines are shown by the Actien Gesellschaft für Papier Fabrik, of Schlogmuhl, near Vienna, and the Theresienthaler Paper Factory exhibit the marble paper so familiar in the hands of book-binders, and also clever imitations of leather and cloth. Ignaz Fuchs, of Prague, has a case of excellent embossed stationery in antique and mediæval designs, and the many manufacturers of cigarette papers are fully represented.

A very conspicuous place and a deserved prominence are given to the splendid exhibit of boots and shoes, and particularly ladies' fancy shoes, from the famous factory of A. R. Lowenstein, of Vienna.

BELGIUM.

In view of the Paris Exhibition, Belgium has not contributed much towards the Melbourne one. The Agence Générale des Glaceries Belges, of Brussels, has sent some noble examples of mirrors, one 14 feet by 12, and another an oval 13 feet high, together with a fine triptych in a handsome Renaissance frame, all of them having two-inch bevels; and there are besides some excellent exhibits of colored window glass, by M. Mondron, of Lodelinsart; and a stained-glass window, of exceptional merit, by M. Pluys, of Malines.

Some superb specimens of the delicate lace for which Belgium is celebrated are exhibited by three firms in Brussels, by one in Antwerp, by the institute for assisting destitute women in the last-named city, which also sends some underclothing manufactured by its inmates, and by a house in Bruges. The most noticeable of the other textile fabrics are the damask napery, bleached and unbleached, exhibited by A. Ruy, of Brussels, one of the largest manufacturers of linen sheetings in Belgium, equal in quality to the best of the Scotch and Irish; the Italian

cloths, serges, tweeds, merinoes, and cashmeres produced by the Société Anonyme at Loth; and the woolen materials turned out by Darimond & Frères, of Verviers, a place in which this branch of industry furnishes employment to upwards of 30,000 people.

The leather exhibits of M. Bertin, of Brussels, claim to be the result of a new process of tanning; and among the other items in the Belgian Court which appear entitled to special mention, are a large bell weighing upwards of half a ton, from the foundry of A. Beullons & Co., of Louvain; an interesting collection of repoussé work in bronze, by A. Arens, of Antwerp; some carved oak side-boards of a massive character from Antwerp, Ath, and Malines; and the roofing materials and architectural ornaments in zinc from the celebrated Mines et Fonderies de Zinc de la Vieille Montagne, at Chenee.

An attractive case of marble clocks and tazza of every description has been furnished by I. Brauburger, of Brussels, and another by Victor Denis; while some trophies of pure white sperm, artistic in design and effective in arrangement, illustrate the material employed in the Royal Manufactory of Court Candles at Brussels, which consumes 40 tons of stearine daily, and turns out 25 tons of candles every twelve hours.

Some beautiful paintings on enamel, executed by ladies, are exhibited by Messrs. Dusseldorp & Zoon, of Brussels and Antwerp. They are in imitation of early miniature paintings, and are intended for ornamental purposes in connection with watches, jewelry, porte-monnaies, card-cases, etc. The same firm has a large display of diamonds, which are cut in Antwerp, mostly by Dutch artificers. Most of the bracelets in which these are set, I observe, are so constructed as to leave all their constituent portions flexible, and thus at each movement of the hand or arm an additional flash and sparkle is occasioned by the mobility of the individual gems. In some instances a spray is of such a composite character as to admit of the detachment from it of five distinct parts, each of which can be used as a separate brooch. From the local representatives of this firm I learned the somewhat striking fact that the people of Victoria purchase more diamonds in proportion to their numbers than any other population in the world; the agents I have mentioned importing stones of the value of £2,000 every month. The demand was inflated to an extraordinary extent during the years 1887 and 1888, owing to the large and rapid fortunes made by a speculative section of the community, in connection with a land and a silver mining boom; the wives and daughters of the *nouveaux riches* invariably hastening to decorate themselves with diamonds as an outward and visible sign of their improved circumstances.

THE PICTURE GALLERIES.

To the great bulk of the visitors to the Exhibition no portion of it has been so permanently attractive as the picture galleries; and never before have the people of Australia seen so many master-pieces of modern art congregated together under one roof, in their own country, as have been presented to their admiration on this occasion.

The British Loan Collection, to which the Queen, the Duke of Westminster, and the owners of many fine galleries in England liberally contributed, has proved to be a revelation to the younger and therefore native-born population of the colony; for it has brought them face to face with the works of painters previously known to them only by repute, or through the medium of engraved copies of their pictures. Some of the most famous portrait-painters of recent times are nobly represented in the collection, which includes examples of Sir Thomas Lawrence, John Hoppner, Sir E. Landseer, and F. Holl, among those who have passed away, and of Sir J. E. Millais, G. F. Watts, Sir Frederick Leighton, H. Herkomer, and Stacy Marks among the living. The earlier landscape art of England is illustrated by John Constable, Richard Wilson, and the elder Crom, and the next stage of its development by Turner, Callcott, Clarkson Stanfield, and W. Linnell; while contemporary art in this branch finds masterly exponents in Vicat Cole, Keeley Hallswelle, Peter Graham, G. H. Boughton, and N. Chevalier. Marine painters are admirably represented by some of the best work of Clarkson Stanfield, E. W. Cooke, E. Hayes, and Colin Hunter. David Roberts, Prout, and Wyke Bayliss figure among the painters of architectural interiors; while religious, historical, anecdotical, and genre subjects meet with a vivid interpretation at the hands of men like Sir Frederick Leighton, Holman Hunt, Sir George Hayter, Calderon Egg, Alma Tadema, Dyce, Leslie, Poole, Topham, and others; and animal portraiture is splendidly exemplified by Sir Edwin Landseer, the veteran Sydney Cooper, R. Ansdell, and Briton Riviere. In British sculpture the only exhibitors are Mr. J. E. Boehm, R. A., and Mr. H. C. Marshall, R. A.

Next in point of interest and value to the foregoing is the Victorian Loan Collection. For in these colonies, as in the United States, the acquisition of wealth begets a desire on the part of the more intelligent of its possessors to form picture galleries, or to adorn the walls of their houses with the works of artists of acknowledged eminence, and the result is that many excellent British and continental painters, by whom there are no pictures in the national galleries of Melbourne, Sydney, and Adelaide, have found purchasers for their canvases among private individuals in Australia. Hence the visitor experiences the gratification of examining a superb work by Gérôme, some striking landscapes by Carl Heffner, an example of Munthe, a masterly transcript of the rural scenery of midland England by B. W. Leader, some exquisite little

gems in the way of microscopic manipulation by Bargue and Seiler; together with examples of Bonington, Etty, Goodal, Constable, Nasmyth, Turner, Marcus Stone, De Nittis, Fahey, Stanfield, Douzette, Holmberg, and other artists in the Victorian Loan Collection, adjoining which is a gallery of oil paintings by Victorian artists exclusively. Most of these have studied in Europe, however, and can not be regarded, therefore, as racy of the soil. Neither can it be said that up to the present time a distinctively Australian school of art has been formed, although, as the landscape scenery, the flora, and the atmosphere of this island continent have characteristics which differentiate them from those of any other country on the face of the globe, the presumption is that landscape painters will arise who will reflect these characteristics upon their canvas as faithfully as Gordon and Kendall have done in their poetry. But up to the present time only one such artist has appeared—the late Louis Buvelôt, and he was a Swiss who came out to Australia late in life, and seemed to be gifted with a singularly acute perception of the essential features of Australian scenery, and with a remarkable faculty for interpreting them. As regards the rising landscape painters of the country, they appear to be very much under the influence of the French impressionists.

In the German Gallery the number of pictures by the great living masters of contemporary art in Germany is limited. Professor Gude sends a masterly coast scene on the shores of the Baltic, representing the turbulent condition of the sea and sky after the subsidence of a heavy gale; and the late director of the Academy at Munich, who recently died full of years and honors, Karl von Piloty, has signed a powerful but painful picture representing the death of a female martyr, whose body has just been brought down into the vaults underlying the arena of the amphitheater. Landscape subjects predominate in this collection, and the artists appear to excel in the portrayal of sylvan scenes, as if the love of the forest which animated the Teutons in the time of Tacitus still survived in the hearts of German artists.

The woodland glades and leafy cloisters of Professor Ludwig, of V. Ruths, of G. H. Engelhardt, of J. Rummelspacher, C. B. von Loefen, G. Koken, and T. N. von Starkenborgh are charmingly true to nature, and are painted with characteristic conscientiousness and thoroughness.

Scandinavian sounds and mountains find an enthusiastic and veracious interpreter in A. Normann, who shows the geological structure of the rocks as well as their form and color; while the waves of the Atlantic have been studied with singular success by a young marine painter named Schnars-Alquist, who will probably be heard of some day in the United States. The German Gallery is particularly strong in genre pictures, illustrating the humorous and pathetic as well as the homely and domestic incidents of social life in the Fatherland; and such pictures as the "Bavarian Beer Tap," of Prof. A. Gabl; as the

"Drowned," of A. Zimmerman; the "Only Friend," of E. Hallatz; the "Horse Market," of F. Hochmann; the "Village Choir," of Professor Max Michael; the "Anxious Moments," of Professor Hildebrandt, and the "Cloister Garden," of W. Marc, may be singled out from many clever pictures of the same kind as combining good technical qualities with much dramatic expression, and, where necessary, deep feeling.

To an American, familiar by observation or report with the hundreds of masterly pictures, by modern French artists, to be met with in the private galleries of collectors in the United States, the oil paintings sent out to this Exhibition present themselves as a painfully inadequate representation of French art. Its Dii Majores are conspicuous by their absence; and the only artists of any note who have contributed examples of their work—and not always good ones—are T. Lobrichon, Émile Bayard, C. Landelle, Charles Frere, Louis Barillot, P. L. Delange, J. A. Rixens, and Berne Bellecour. The pictures sent out from Paris to the International Exhibition held in Melbourne eight years ago were, I am assured, very superior on the whole to the present collection.

Belgium makes a much better display. Professor Portaels contributes a Flower Girl of Trieste, and his pupil, Émile Wauters, the historical painter, has an animated picture of an episode in the turbulent life of Brussels during the reign of Duke John of Burgundy; while from the pencil of K. Ooms has proceeded a dramatic representation of a poignant scene in the "Spanish Fury," in Antwerp, A. D. 1576. Two very fine cattle pieces, by Edmond de Pratere, are admirably painted; and the landscapes of Van Luppen, Madame E. Beernaert, Van Damme, Plasky, and Janssen denote a close and affectionate study of nature on the part of the executants. Among the figure subjects, E. Farasyn's "Old Fish-market at Antwerp," the touchingly depicted "Orphans," of Bourotte; the cleverly modeled "Sylph," of Émile Claus; the "Widows of Katwyck," and "Orphans of Katwyck," by T. Cogen; the "Waiting," of E. Slingeneyer, and the idyllic "Summer Evening," of Theodore Verstraete are entitled to a special meed of praise. M. Bossuet has sent one of his favorite studies of Spanish architecture, glowing with light and heat; and the numerous genre pictures and flower pieces which are exhibited go to prove how faithfully living artists in Belgium follow the methods and traditions of their Flemish predecessors.

THE ARMAMENT COURT.

In a spacious annex, specially erected for the reception and display of implements and munitions of modern warfare, are arranged the exhibits received from the great arsenal of Sir W. Armstrong, Mitchell & Co., of Elswick, near Newcastle on Tyne, covering 40 acres and employing 3,500 men. Among the more noteworthy of the deadly instruments of destruction brought together here is a 36-pounder simultaneously loading gun, weighing 4,648 pounds, on recoil mounting.

From fifteen to twenty rounds can be fired from it per minute; and this is accomplished by two electric batteries, one on each side of the gun. On pulling the trigger of a pistol, the circuit is completed, provided the breech is closed; but supposing it is not, the current is interrupted and the firing can not take place. The training and elevating gear is worked by hand-wheels, and the gun recoils in a brass cradle, the force of the rebound being met by a piston working in a conical cylinder filled with oil, and the gun is forced back into its proper position by a powerful spring inside the cylinder. This gun is 17 feet in length and is protected by a steel splinter-proof shield. The latest Gatling gun is also shown. It has ten rifle-barrels grouped round a central spindle, cased in brass, and fitted with a drum for holding one hundred and four cartridges, which drop down from it into the cylinder of the gun and are automatically ejected from thence as soon as they have discharged their duty. It is claimed for this gun, which is furnished with a bullet-proof shield, that six hundred rounds can be easily fired from it per minute. Another Gatling gun is exhibited mounted on a field carriage with limber-boxes to contain sixteen drums of cartridges.

The employment of gun-cotton shells in warfare has necessitated the discovery of some material for fortifications and for armor-plated vessels, capable of resisting such terrible explosives; and this seems to have been found in the chilled iron invented by Herr Gruson, of Magdeburg, which possesses the hardness of steel but is free from its brittleness. A working model is shown of a revolving turret mounting two guns. A dome-shaped cupola, consisting of detached plates not fastened together in any way, but kept in place by their own weight and counterbalance, and deflecting the impact of projectiles by the resistance of the whole mass, overarches this turret and is moved by means of a capstan in the lower casemate, enabling the guns to fire around the whole circle of the horizon; while suitable hand gear is also provided for raising or depressing the guns as may be required.

As many as four hundred of these turrets have been constructed since 1873, besides sixty-nine chilled-iron batteries.

Messrs. Thorneycroft & Company, of Chiswick, Middlesex, who have built as many as nine torpedo-boats for the protection and defense of the harbors of Victoria, Queensland, Tasmania, and New Zealand, exhibit some excellent models of the vessels thus constructed. The largest of the latter, which lies ready for service in the waters of Port Phillip, has a length of 113 feet and is 12 feet 6 inches on the beam, with a draft of 6 feet. Its burden is 12¾ tons, and its trial speed upwards of 19 knots an hour. Its armament consists of two launching tubes for 15-inch Whitehead torpedoes and two Hotchkiss guns. Models of torpedo vessels built by this firm for foreign Governments, as also of patrol steamers intended for river service, are likewise exhibited, together with missiles and explosive agents, indicating what may be called a diabolical ingenuity in making science the handmaid of human carnage.

And here it may not be irrelevant to mention that the whole of the Australasian colonies appear to be fully alive to the fact that, in the event of Great Britain being involved in a war with one or more great maritime powers, the enemy would be pretty sure to make a dash at them; and therefore measures have been taken to place such important ports as Melbourne and Sydney in a state of defense so complete and efficient that it is believed they are both virtually impregnable, while the mother country undertakes the patrol of the sea.

THE MINOR COURTS.

ITALY.

Under the classification of "Minor Courts" are arranged together in an annex to the northwest of the main building the collections of exhibits sent from such countries as have not thought it worth while to be officially represented, and who have no special commissioners, but whose residents and manufacturers, nevertheless, have been bold enough to send out goods for exhibition on their own individual accounts. Italy, which, at the Exhibition of 1880 and the preceding show in the Sydney Garden Palace, made, as I am informed, a magnificent display, and attracted so much attention by the beauty, the artistic quality, and intrinsic value of the goods then exhibited, is on the present occasion content to occupy a place of very second-rate importance in the Minor Courts; and of what that country sends, the little that is good is to be found in the main entrance hall. There the firm of Boucinelli, of Florence, exhibits specimens of the jewelry, principally in mosaic, for which Italy is famous. The beautiful Florentine mosaic work, the well-known results in which are obtained by inlaying various-colored substances on a background of black marble, is fine, but small, and in no way comparable with prior displays. The same firm also shows the enamel mosaics manufactured at Florence, but more generally known as Roman, in which the coloring is much more brilliant, but of which, as a rule, only small articles of personal adornment—pins, brooches, and rings—are made. There are also Neapolitan corals and black oxidized silver work, with some clever designs cleverly executed. The most interesting and beautiful examples of gold work to be seen in this collection are the brooches, bracelets, and necklets, designed after the old classical models, and which are remarkable for their exquisite workmanship and the grace and charm of the tasteful designs. It is only a few years back that a celebrated Roman art jeweler, Signor Castellain, discovered the adaptability of the ancient Etruscan patterns and designs to the purposes of modern decorative jewelry, and his success in employing them has had the effect of reviving to a very large extent the influence of Greek and Roman art in modern matters of taste. Signor Castellain was also successful in reviving the art of granulating surfaces,

which was extensively practiced by the ancient Etruscans, but then became lost to sight for centuries, until it was discovered that the practice had been handed down from generation to generation among some obscure gold workers in the Abruzzo. Besides the more minute kinds of mosaic work, there are large plaques and other articles similarly treated, in which the delicate shade of pink (for which a sea-shell is used), the forget-me-not blue (represented by turquoises), the green of malachite, the beautiful blue of the lapis-lazuli, and the various tones of gray and white obtained from different kinds of marble are all used with the best possible effect; also in the main hall, at the rear of this collection, are some pieces of statuary by an artist named Fulli, some of a certain degree of merit, but mostly of an indifferent character, commonplace and inartistic. The display of statuary by Cecchini, of Florence, in the Minor Courts, is also only second rate, except, perhaps, in respect of one or two subjects—a couple of Pompeiian vases of serpentine and some carved mantel-pieces of the same material. Antonio Rizzo shows in an adjoining case some shells very prettily carved in cameo, and the familiar brooches in coral and lava; and possibly more attractive still, though yet in the minor order of interest, is the exhibit of Santa Maria, of Rome, who sends a collection of bracelets in oxidized silver, and a number of figures neatly carved out of lava, a group of Neapolitan holiday-makers thus executed being particularly happy, both in respect of humorous treatment and artistic modeling. Cameo-shells, mosaics, pendants made of gold and corals, lava bracelets, and Genoese silver filigree work are also shown by this exhibitor, and in an adjoining collection are some pretty specimens of jewelry in most of the styles already alluded to, and in addition mugs of cornelian and other gems cut in cameo and intaglio. The Italian exhibition this time, it will be seen, is, therefore, only of an indifferent character in its way, but being Italian is almost necessarily pretty and attractive; but, as a whole, the show is most meager, disappointing, and unsatisfactory.

INDIA.

The present Exhibition has not been officially recognized by the Indian government, and knowing the timidity of the natives on the point of traveling beyond the confines of their own country, the exacting caste prejudices which impose on returned voyagers heavy expenses to insure their readmittance into the caste orders, as well as the inconvenient and somewhat degrading ceremonies, such as the shaving off the mustache, the bathing so many times a day in the sacred waters of the rivers, burning gold over the head, and the system of coventry, no intercourse with his fellow-men being allowed for several days, all of which have to be punctiliously performed—remembering all this, it is not surprising that native exhibitors should shrink from making such large sacrifices for problematical returns. There have, however, been some who have dared so much, and to such the Exhibition is beholden for several inter-

esting exhibits, though the whole collection is said not to be as attractive as that which was one of the minor features in the Exhibition of 1880. That of Isarold Dhurmdas, "the Sind Bazaar," is the most imposing display on the present occasion. Many beautiful examples of gold and silver thread embroidery decorate the exterior of the little court within a court, and these worked into floral designs for caps and slippers, and into carpets of closely-woven texture, warm with rich colors blending into bright and pleasing effects, go to form an appropriate introduction to the fabled wealth of India, of which many illustrations are to be found in the dazzling court beyond.

The natural love of even the humblest of the natives for gold and silver ornament finds expression in the endless articles of costly personal adornment herein displayed, the delicacy and beauty of the workmanship in which is the constant source of astonishment and admiration even to the European artist. An Indian laborer will pride himself upon the quantity and costliness of the jewels with which he loads his wife, and the general demand for the ornaments they prize so highly keeps in constant and lucrative employment the thousands engaged in their manufacture; and in this court we have excellent indications of the particular directions in which the popular taste runs. The famous diamond-cut silver jewelry is represented by many specimens of bracelets, armlets, lockets, brooches, and bangles, and there is also an excellent collection of the not less celebrated Trichinopoly, Cutch, and Delhi jewelry.

Travelers in India know the mats made of roots, which, placed in the railway carriage and kept damp, enable the traveler, even on the hottest days, to journey in a cool and fragrantly-perfumed atmosphere, and here are shown a number of fans made of that luxurious root, as well as of the glorious plumage of the peacock. Carved sandal-wood boxes with mythological figures in high and low relief, and the pretty inlaid woodwork known so well as "Bombay boxes," and filigree work, are extensively exhibited, as also some specimens of enameled ware.

The beautiful Dacca muslins, celebrated for their purity and fineness of texture, and exported to Western Europe by way of Egypt when the Roman empire was enjoying the period of its greatest glory, and as famous to-day, are represented by some choice specimens of curtains and window-hangings. Some of these muslins bear names in the vernacular translatable into English by such phrases as "woven air," "evening dew," and "running water;" and pieces of this description a yard wide and 20 yards long can be easily passed through a wedding ring.

There are specimens here, also, of the products of the similarly antique art of making those shawls of Cashmere and Punjaub, which have been famous from the time of Alexander the Great, and which, for their silky softness, the remarkable arrangement of colors, and the elegance of their embroideries, have been the envy of the world ever since. The silk fabrics occupy a conspicuous position, the best brocades coming

from Ahmedabad, in the Bombay presidency. Their superiority is marked by the brilliant colors imparted to the silk and the chaste purity of the embroidery work, and all visitors to the court are struck by the singular beauty of the gold embroideries on net which are shown, and which find their principal use in the adornment of ball dresses. Only a few samples of the raw products of India are shown, these being cotton-grain, and pulse, while there are several exhibitors of all brands of teas, Indian teas having become very popular in the colonies. There is a splendid collection of gilt bronze work, and an Indian optician explains and illustrates a patent system of sight-testing.

JAPAN.

This is another country which, making, I understand, a splendid display at the last Exhibition, is content on this occasion to occupy a very second-rate position. But nothing that is Japanese can be slovenly or uninteresting, and so, even with the limited opportunities afforded, there is yet a great deal that is instructive and attractive in this small court, while the whole is arranged with characteristic neatness and taste. The principal exhibitor is Mr. J. Numashima, a Japanese merchant in business in Melbourne, and he has collected together an engaging assortment of curiosities and representative articles. In this section the eye first rests upon a group of two figures in carved wood and ivory, a curious and beautiful piece of work representing a dream of a famous commander-in-chief, Kusouskie Masashige, who flourished in the reign of the Mikado Godaigo Tenno, A. D. 1309. He dreamed he saw two men representative of great intellectual power and physical strength, and the latter is shown in the person of a man of enormous muscular proportions, who supports with his left arm a bowl in imitation bronze, supposed to weigh 1,000 pounds, with so much ease that with his right hand he is engaged in writing poetry; while the former is indicated by an old sage sitting wrapped in thought. The attitude of the athlete is extremely spirited, and forms an admirable contrast to the sedate and contemplative pose of the philosopher, while the action of the whole is skillfully represented, and the general workmanship is exceedingly careful. The table on which the writing is being done is a beautiful piece of work covered with very elaborate ornamentation; the heads and hands of the figures are of ivory, the bodies of wood overlaid with gold lacquer; the sword slung across the broad shoulder of the standing figure is of solid oxidized silver inlaid with gold lacquer also, and the complete group stands upon a carved support of wood, with inlaid mosaic top of two kinds of wood. The court is studded with the handsome, richly carved, ornamented, and tastefully embroidered screens so familiar to all visitors to Japanese warehouses. One panel shows a capitally drawn eagle sitting on the bough of a tree watching some small birds flitting airily to and fro, and a companion panel represents the *same eagle* swooping down upon its prey, which are making off in every

direction. The pictures are instinct with life and character, and the movement and spirit put into the little birds flying away in terrible dismay are most realistic. The eagle is in ivory, and the leaves and blossoms of the tree of the same material mixed with pearl; the screen is surrounded by a heavy border of dark wood, richly carved in grotesque designs of dragons and scroll-work, and on the obverse sides are representations of storks, in gold lacquer, feeding among the reeds. Other screens show a famous minister of state, who went on the first political mission to China in A. D. 754, and a Japanese lady of the same remote period richly attired in the costume of the time. There are numbers of fine specimens of bronze work, one, in the form of an incense-burner with six dragon handles and six feet, being particularly remarkable. The body is beautifully executed in various designs, and on the top is a cover supporting two children blowing a trumpet and beating a drum, the workmanship of which is extremely fine. Notice is also claimed by a pair of small iron plates inlaid with gold and silver, and the curious specimens of damascene work made in Kioto. There are also some exquisite examples of carved ivory and inlaid work, all executed in the very highest artistic manner by an eminently high artistic people, the carving on ivory being alone sufficient to engross the whole attention during a lengthened visit to the court. Some fine cloisonné ware and porcelain is also shown, and with bronze plaques, Satsuma vases, Kaga ware, and other specimens of characteristic faience, go to swell an interesting collection. There are a couple of immense carved cabinets in Shitan wood, and several pieces of richly painted silk and satin.

MISCELLANEOUS.

The Minor Courts further comprise exhibits from Malta, Turkey, Spain, Switzerland, Ceylon, Havana, Holland, Norway, Denmark, and Russia, but they are rather individual's shows than national representative collections, and scarcely call for more than passing notice. Norway is represented by hardware and cutlery, a carriole, or two-wheeled buggy, life-belts and buoys filled with reindeer hair, fish-oils, and preserves. In the Swiss section there is a conspicuous trophy of Nestle's milk-food for infants, and a chalet containing an embroidery machine, besides a collection of trimmings and laces, white wines, cigars, and tobaccos, and mechanical musical instruments, with tool machinery and electric plant complete the display. Portugal sends liquors and wines, and Malta is represented by tobacco and cigarettes, Havana and Ceylon by cigars, Denmark by cotton goods, and Russia by wooden ware. Holland is noticeable for fermented and distilled drinks and cocoa, Van Houten & Company having erected a handsome kiosk hard by to dispense that beverage. China sends furniture and fancy articles of only ordinary interest, and tea in large quantities. Madagascar shows collections of shawls, laces, mattings, and fibers, Spain cigars and wines, and Turkey opium, raw drugs, and tobaccos. In the space allotted to

the Seychelles Archipelago is a particularly interesting collection of drawings by the heroic General Gordon.

BRITISH NEW GUINEA.

One of the most interesting of these Minor Courts is that which contains an ethnographical collection from the British portions of the island of New Guinea, because it illustrates a phase of human progress exactly similar to that which our European forefathers passed through when they built their habitations upon piles in the lakes of Denmark, Bavaria, Upper Italy, and Switzerland; just as the Papuans do at this day. Here, upon one of the largest islands in the world, and only separated by a narrow strait from the Anglo-Australians, "heirs," like Americans, "to all the ages," is a race of men in whom the religious instinct is only just beginning to dawn, and the sentiments of fear, wonder, or adoration inspired in their minds by the tremendous potency of the natural forces in operation around them, find expression in the worship, or possibly the propitiation, of the grimly grotesque idols, rudely carved and still more rudely painted, which are here exhibited. The New Guinea savage is just beginning to lisp the first letters of the alphabet of art; and between the crude essay of the dark-skinned barbarian and the noble achievements of the contemporary sculptor in marble and bronze what centuries of patient effort, of continuous failures crowned with ultimate success, of slow progress, of painful endeavor, of lofty aspirations and unfulfilled ideals, have intervened! The human race seems to pass through the same apprenticeship, and even to learn the same lessons, when acquiring the elements of the industrial and ornamental arts, no matter what part of the globe may be assigned to it, or at what era of the history of the world a particular tribe or family may be passing through its pupilage. Some of the decorative forms employed by these Papuans do not differ materially from those traced upon the cinerary urns which have been disentombed in the basin of the Po, and belong to what is known as "the age of Villanova." There is the same regular recurrence of particular forms, and the same striving after balance, symmetry, and proportion. And it is interesting to observe that the forms of their water-jars resemble those of the primitive vessels of Greece—the *stamnos* more particularly—and that while the Hellenic potters invented and named about forty varieties of this kind of ware, the natives of New Guinea have no less than ten. Curiously enough, moreover, the decorations of the pottery made by the inhabitants of New Guinea and the neighboring Solomon Islands—articles which are largely trafficked in—bear an obvious resemblance to those of the vases of Théra, preserved in the French School of Athens, of a *pyxis* in the museum of the Archæological Society in that city, and of the neck and foot of the amphora of Milo, which forms one of the treasures of the cabinet of the superintendent of antiquities in that city. In fact, the palmetto scrolls

on the shield hanging up on the left-hand side of the figure of Semese, in the New Guinea Court, is so exactly like a similar bit of decorative work which is incessantly repeated on the great amphora just referred to, that it might be supposed to have been copied from it, were it not that any such imitation is manifestly impossible. I do not know that these resemblances have been pointed out before; while it is also worthy of remark that the musical instruments in use among the inhabitants of New Guinea recall those which were employed in very early times in some of the most advanced nations of the world. There are the Pandean pipes resembling those upon which the goat-footed son of Mercury played upon the mountains when he was so cruelly mocked by the elusive Echo of whom he was enamored; and there is also a fife not unlike that which the same sylvan monster is represented as holding in his hand in that famous statue of him which adorns the collection of the Louvre. There is likewise the earliest form of the drum, consisting of a hollow tube of wood placed lengthways on the ground and struck by two short sticks; together with conches, having a hole pierced for the lips on the side of the spire, which must have been the first trumpets ever blown, for was it not the instrument of Triton with which Ovid and Milton have rendered us familiar? But what ages separate these from the modern orchestra, with its rich variety of stringed, brass, reed, and parchment instruments! What an enormous interval has to be bridged over by a race whose ears are capable of deriving gratification from the monotonous dissonance of Papuan "music" before it can be qualified to enjoy and comprehend Rossini's overture to "William Tell," Mozart's "La ci darem la mano," one of Beethoven's symphonies or Bach's fugues, the Hailstone Chorus of Handel, Haydn's "Creation," or a reverie by Chopin. It is only when one is brought abruptly into contact with a race upon whom the morning twilight of civilization is only just beginning to dawn, and finds its feeble essays in workmanship and art placed in immediate juxtaposition with some of the highest achievements of the most advanced of the Aryan peoples, that one begins to understand and appreciate the privilege of participating in the heirship of the ages, and of being "foremost in the ranks of time."

THE AUSTRALASIAN COLONIES.

As may be readily imagined, the natural products of these young countries form a large proportion of their exhibits. With a soil so rich in minerals, a boundless extent of territory suitable only as regards immense areas of the interior for pastoral purposes, and cheap land for the corn grower, industrial enterprise was naturally directed, in the first instance, to the breeding and rearing of sheep and cattle, to the production of wool, meat, tallow, and hides, to the cultivation of wheat, barley, oats, fruit, potatoes and vegetables, and to the raising of dairy produce. Then the discovery of gold almost simultaneously in New

South Wales and in what is now Victoria, but was then a province of the former colony, was followed by a great and rapid influx of population, and by an expansion of mining industry precisely analogous to that which took place about the same time in California.

It was presently ascertained not only that gold was widely distributed over the continent of Australia, from the south of Victoria to the north of Queensland, and that it was also deposited in Tasmania and New Zealand, but that silver, copper, tin, iron, antimony, and other minerals were hidden away in the cellars of the earth in this part of the world. But as, in process of time, there was a steady and considerable diminution in the annual yield of gold, it was found necessay to open up fresh outlets for the employment of capital and labor; and Victoria essayed to become a manufacturing country by adopting a fiscal system based upon protection. Some of these manufacturing industries, as, for example, those of glass and pottery, are only in their infancy, while that of the woolen miller has had a hard struggle for existence, notwithstanding the heavy handicap imposed upon all imports of this kind; and at the present moment the tweeds, blankets, flannels, and other fabrics issued from the factory at Mossgrel, in New Zealand, seem to bear away the palm from competitors on the Australian continent.

VICTORIA.

This, the most compact of all the colonies on the mainland, with an area closely approximating to that of the United Kingdom, and a million of inhabitants, occupies nearly 8 acres of space in the Exhibition building with its multifarious exhibits. Gold, wool, wheat, and wine are the main sources of its prosperity; and no pains have been spared to impress these facts upon the minds of visitors.

A gilded obelisk represents the entire mass of the precious metal which has been extracted from the soil, between 1851 and 1886, its value being upwards of $1,000,000,000. There are some splendid exhibits, but the pastoral industry in Victoria appears to be declining because much of the land formerly occupied by pastoralists is now being converted into farms; and the growth of cereals has extended so rapidly of late years as to leave a large surplus available for exportation.

But, in the near future, there is every probability of Victoria becoming more celebrated for its wines than for any other of its productions. What is very noticeable about them is their diversified character and strength. South of the dividing range the soil and climate combine to bestow upon the wines the flavor, bouquet, and lightness of the Rhine wines of Germany, and of the secondary clarets of the Medoc district of France. North of that chain of mountains the vineyards yield ports, sherries, madeiras, burgundies, muscats, tokays, and full-bodied clarets, while in certain localities the wines almost approach liqueurs in delicacy of flavor. But the art of blending, so as to secure uniformity of sa-

and quality, year by year, and the management of cellars are at present but imperfectly understood, and this operates to the disadvantage of the wine-growers. Brewing appears to be an especially profitable business in Victoria, and one large establishment pays its share-holders a dividend of 25 per cent. per annum. But the malt liquors, as a general rule, appear to be new, heady, and rapidly fermented, and will not bear comparison with the best of the American, English, or German malt liquors. To enumerate the various manufactures established in the colony, as represented in the Exhibition, would be tedious and unnecessary. Woolen yarn and fabrics are made in six mills, situated at Yarraville, near Melbourne, Geelong, Ballarat, and Castlemaine, but, as has been said elsewhere, with not very encouraging financial results. Clothing factories, in which piece goods are made up into articles of male and female wearing apparel, are both numerous and profitable, as a large section of the female population of the large towns prefers this kind of occupation at a poor remuneration to earning good wages and securing comfortable homes in domestic service. Carriages of all kinds are turned out in excellent style and material by the local builders, and the furniture manufactured by the large houses in Melbourne, mostly from European designs, will compare advantageously in workmanship and other respects with that of the more famous London cabinet-makers. Indeed, the suites of apartments filled with drawing, dining, bed-room, and library sets, in the Victorian Court, are among its most attractive exhibits. And similar praise must also be awarded to a fine trophy erected by the Apollo Soap and Candle Company. The manufacture of glass and pottery is only directed, for the present, to the production of articles of general utility; but in the matter of biscuits and other farinaceous products, aerated waters, cordials, harness, and saddlery, leather-work, cooking-stoves, pickles, sauces, and jams, preserved meats and soups, railway-carriages and tram-cars, gold and silver smiths' work, lamps, and of articles which enter largely into the construction and decoration of domestic residences, public buildings, and ecclesiastical structures, it is evident that the colony of Victoria possesses both the skilled artificers and the spirit of enterprise which enable her to dispense with external sources of supply when meeting the requirements of a population sufficiently prosperous to indulge in a liberal expenditure in all these particulars.

NEW SOUTH WALES.

This, the mother colony of the group, originally settled as a penal establishment by Great Britain, and now one of the freest and most flourishing members of the Australasian family, covers an area of 310,700 square miles and contains a population of 1,042,919. The first thing which impresses one on visiting the spacious courts assigned to it in the Exhibition is the magnitude and diversity of its mineral resources,

specimens of which meet you at every turn, and convey an imposing idea of the natural wealth of the country. Pyramids of auriferous ore, tons of argentiferous quartz and silver ore, blocks of tin and copper, of asbestos, lead, alum, alumnite, galena, wrought and pig iron, and cobalt ore, together with masses of coal and kerosene, and samples of diamondiferous drift, bismuth, mercury, and cinnabar, to say nothing of marble, building-stones, fine clays, and slate, serve to exemplify how lavish nature has been of her gifts to this important portion of the Australian continent.

The wool exhibits are no less remarkable, both as regards quantity and quality, furnished, as they have been, by something like fifty pastoralists scattered over the entire colony, who have sent in bales and fleeces of greasy and scoured wool, taken from sheep of all ages, and comprising every variety, from the coarser and cheaper staples up to the most silky and high-priced merinos. Nor can I better illustrate the importance of this branch of industry to the two foremost of the Australian colonies, namely, New South Wales and Victoria, than by mentioning that the annual clip of wool in both exceeds the yearly production of the same article in the whole of the United States. I may also mention that at the recent wool sales in Melbourne American buyers topped the market, securing, at the highest prices paid on that occasion, the choicest of the staples submitted to public competition.

Wheat, maize, and Egyptian corn figure largely among the exhibits in the New South Wales Court, and upwards of one hundred and forty dairymen have sent in specimens of their cheese and butter, both of which are produced of excellent quality in certain districts where the average rain-fall is sufficiently large to insure succulent pastures. The Richmond River Sugar Company shows how well adapted the sub-tropical districts of New South Wales are for the cultivation of the sugar-cane. The plantations comprise 6,000 acres at present, with an average production of 28.39 tons per acre. The wines of the colony are also well represented in the Exhibition. They are, for the most part, of a generous character, and have been classified by French experts as *grande vins*. As many as 8,000,000 dozen of oranges, grown upon 8,000 acres of land, prove inadequate to supply the demand for this fruit in New South Wales and the neighboring colonies; but the cultivation of green fruits seems to be comparatively neglected.

An examination of the exhibits of that portion of the population which is engaged in manufactures suffices to show that these are of an extremely diversified character, embracing iron and brass foundries, the making of agricultural implements and machinery and railway and other carriages, the preparation of preserved fruits and confectionery, ship and boat building, chemical works, breweries, the manufacture of leather, furniture, woolen fabrics, wearing apparel, boots and shoes, woodenware, saddlery, glass, tobacco—of which 680 tons are grown in New South Wales, chiefly by Chinamen—soap, candles, casks, ropes,

and jewelry, employing nearly 46,000 persons out of a population of 1,000,000.

The models of yachts, steamers, full-rigged ships, and life-boats serve to show that there is a considerable spirit of mercantile enterprise among the people of New South Wales, and the exceptionally fine position and noble dimensions of its principal harbor—Port Jackson—have contributed to bestow a commercial importance on the colony, greatly exceeding that of any other member of the Australian group.

Even the Dominion of Canada, with a population five times as numerous as that of New South Wales, is scarcely able to show a larger external trade than the latter. About 60 per cent. of the shipping entering Port Jackson is the property of colonial owners.

SOUTH AUSTRALIA.

This colony, which celebrated the fiftieth anniversary of its foundation on the 28th of December, 1886, covers an area, in round numbers, of 900,000 square miles, inhabited by a population of 320,000.

Its economic development followed the same lines as that of its neighbors. The pioneers of its progress were pastoralists; agricultural settlement soon followed, and the discovery of rich and extensive deposits of copper ore at Burra Burra, and subsequently at Moonta, communicated a powerful impulse to mining enterprise, which has recently been directed to silver mining, owing to the important discoveries made at Broken Hill, which, although lying within the territory of New South Wales, is virtually in the hands of the South Australians.

One of the most interesting exhibits in the court under notice consists of upwards of one hundred specimens of the indigenous and exotic flora of the country, furnished by Mr. J. E. Brown, of Adelaide, the conservator of forests. These include upwards of a dozen varieties of the Eucalyptus, some of which are invaluable for use in railway sleepers, jetty and bridge piles, telegraph poles, wheelwright's work, and general building purposes, owing to their extreme durability, whether under water or in moist soil. The native pine, or camphor wood, possesses the property of resisting the depredations of the white ants, which are exceedingly destructive in central and northern Australia; while the native box tree, the milk-wood, the so-called honeysuckle, the myall, the white cedar, the mulga, the blackwood, and the hard whitewood tree are specially adapted for the uses of the cabinet-maker, the turner, and the engraver.

The cereals of South Australia enjoy the reputation of being superior to those of all the other colonies, and, judging from the wheat, flour, biscuits, gluten, and starch exhibited, the reputation is not undeserved in so far as this grain is concerned. Nor must I omit to make special mention of the dried fruits—raisins, currants, figs, almonds, apples, plums, and candied orange and lemon peel—and of the singularly pellucid olive oil, which are exhibited by various growers.

QUEENSLAND.

This colony, which did not begin to be settled until the year 1823, and was not separated from New South Wales of which it originally formed a part until 1859, since which time its population has expanded from 28,000 to something like 400,000, contains an area of 668,224 square miles, and lies for the most part within the tropics, its most northerly point approaching pretty closely to the tenth parallel of south latitude. Its natural resources are vast and various and these form the great bulk of the exhibits in the Queensland Court. These comprise specimens of gold, copper, tin, silver, and lead, antimony, manganese, quicksilver, iron, bismuth, plumbago, soda, malachite, marble and building-stones in great variety, besides diamonds, rubies, sapphires, agates, and opals. The latter besides rivaling in quality those of Hungary, are found in such quantities that the market value of this gem in Australia has been sensibly depressed. As to the coal fields of Queensland, a competent geologist has pronounced them to be equal in extent, if not superior, to those in New South Wales.

Up to the present time the gold fields of this colony, which began to be systematically worked in 1868, have yielded $100,000,000 worth of the precious metal; while the copper mines have had a total output of the value of $10,000,000, and the tin ore had yielded a return of $16,000,000.

Next in importance to the mining industry is that of sheep and cattle grazing and the production of wool. This is carried on over a vast area of country, varying greatly in its depasturing capabilities, which are also largely affected by meteorological causes; for experience shows that throughout the whole of Australia cycles of droughty years follow cycles of comparatively rainy years. But, taking one with another, the value of the annual clip of wool from the 13,000,000 sheep in Queensland may be put down at $10,000,000, while $1,000,000 will represent the annual value of the hides, skins, and tallow exported.

Only twenty-four years have elapsed since the formation of the first company for the growth of sugar in Queensland, and since then the depreciation which has taken place in the price of cane-sugars all over the world has been highly detrimental to the development of this branch of industry in Australia, while it has been further obstructed by the difficulty of procuring colored labor. At the present time there are 36,000 acres under cultivation, and one hundred and sixty mills in operation, yielding 56,859 tons of sugar and 1,510,308 gallons of molasses while ten distilleries turn out 97,375 gallons of rum. Along the eastern coast line of Queensland, between the sea and a dividing range, runs a belt of country 1,300 miles long, exempt from drought and possessing a soil of inexhaustible fertility, and its products, as exhibited in the court and in a conservatory which has been erected for the purpose of displaying and protecting them, embrace the mango, jack-fruit, guava, custard apple, egg fruit, pineapple, banana, tamarind, date-palm, the

Kai apple of Natal, and the *Monstera deliciosa* of Mexico, as well as rice, arrow-root, maize, buckwheat, ginger, sago, tobacco, and a great number of trees yielding dyes, medicinal barks, fragrant essences and essential oils, or fabrics possessing a recognized commercial value; while much of the native timber, such as the cedar, the pine, beech, teak, wattle, gum, nut, rose and blood wood, and bastard mahogany, furnishes excellent material for the builder and cabinet-maker. Specimens of all these, cut and polished, occupy a prominent place among the exhibits, which also include examples of the medicinal oil obtained from the dugong, a fish peculiar to those latitudes; copra, pearl-shell, bêche-de-mer and turtle-shell from Thursday Island, and a fine collection of ethnographical objects from New Guinea. Of course manufacturing industry is only in its infancy in Queensland, but iron, brass, and copper foundries have been established, and ship-building, the making of harness and saddlery, boots and shoes, furniture, woolen fabrics, coaches and carriages, agricultural implements, biscuits, confectionery, soap and candles, appear to be prosecuted with satisfactory results, judging from the samples of their products displayed.

WESTERN AUSTRALIA.

This, the most thinly peopled of the Australian colonies, for it numbers only 40,000 souls, scattered over an area of 975,920 square miles, is geographically so distant from its neighbors that it has not incurred the expense of sending more than half a dozen exhibits to the great show in Melbourne; and three of these are specimens of the jarrah timber in planks and logs, for which that part of the continent is famous. It is a variety of the Eucalyptus, which is capable of resisting the attacks of the termites, or white ants, on land, and of the teredo under water. It is, in fact, virtually indestructible and is therefore invaluable for all purposes of marine architecture and railway construction. Vessels built of it can dispense with copper sheathing, and shipwrights prefer it to either teak or oak. It grows chiefly on iron-stone ranges, and sometimes attains a girth of 60 feet at 6 feet from the ground. The jarrah forests in Western Australia cover, it is estimated, an area of 14,300 square miles, while double that extent of country is occupied by other trees, second only in commercial value to the foregoing, the sandal wood among the number. Some idea may be formed of the durability of the jarrah, that piles which have been sunk for a period of forty years in both fresh and salt water have been taken up and found to be perfectly uninjured, and have then been turned to account for furniture-making and have been French polished. In grain and color it bears a striking resemblance to Honduras mahogany.

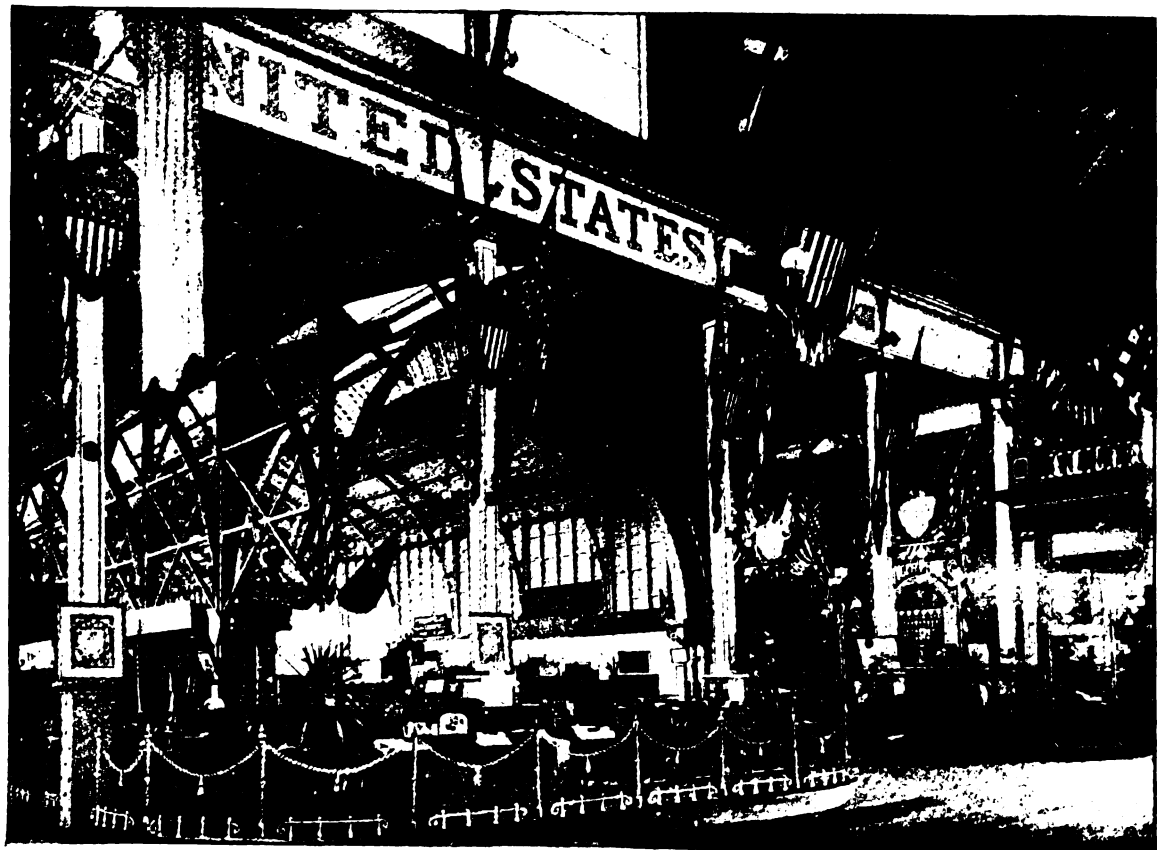
Western Australia's mineral resources comprise gold, silver, lead, copper, iron, and tin; and its pearl fisheries are of considerable extent and importance; but the paucity of its population is a bar to its industrial progress and economic development.

TASMANIA.

The island of Tasmania is reported to be the least progressive colony of the Australasian group; and the loveliness of its scenery and the amenity of its climate will explain, if they are not held to excuse, the tranquil and unenergetic habits of the people. They only number 140,000 and they occupy a territory of 26,215 square miles, one-half of which, abounding with romantic scenery, is a primitive solitude, while nineteen twenty-sixths of the population are engaged in agricultural or pastoral pursuits. I gather from the exhibits that the soil produces excellent wheat, oats, hops, and potatoes; that the dairy produce of the island is also good; that the ale brewed in Hobart, where the water used for that purpose comes down from springs which take their rise in Mount Wellington, immediately behind the city, is quite equal in quality to the most famous brands of imported beers; that the jams, jellies, and marmalades manufactured in the island enjoy a well-deserved celebrity; and that the indigenous timber, comprising many varieties of the Eucalyptus and the blackwood, is largely used for building purposes, for railway sleepers, and for the making of furniture. The most striking exhibits in the Tasmanian Court, however, are those which illustrate the mineral resources of the island. These include gold, silver, lead, copper, tin, asbestos, iron, and antimony. Tasmania is especially rich in tin, of which an immense deposit was found at Mount Bischoff in 1872, and has been steadily worked ever since. The ore yields an average of 74 per cent. of the pure metal, and $20,000,000 worth of tin has been hewn out of the face of the mountain up to the present time. Sheep farming is being pursued upon 1,288,700 acres of land leased by the Crown to pastoral occupants, and the annual clip of wool averages $1,500,000 in value. The island is also famous for its horses, which have all descended from imported stock, and these find a market in India, where they are required to furnish the cavalry with remounts.

NEW ZEALAND.

The three islands of which the colony of New Zealand is composed comprise an area of 104,235 square miles, and contain a population, in round numbers, of 600,000, irrespective of the Maoris, who are estimated at 42,000. Enjoying a temperate climate and an abundant rainfall, the pastures of the colony carry more sheep to the acre than those of any other region in Australia, and the samples of wool exhibited speak volumes for the weight and choice quality of the fleeces of the Lincoln, Leicester, Cotswold, and Romney Marsh varieties. Heavy yields of pedigree wheat, of Danish oats, averaging 70 bushels to the acre, of barley, potatoes, and green crops, attest the favorable conditions under which agriculture is pursued, while the Cheddar cheese produced by its dairymen rival those made in the southwestern counties of England. Gold and silver, tin, copper, iron, antimony, and zinc are



UNITED STATES INDUSTRIAL COURT (MAIN ENTRANCE).

among the minerals liberally distributed beneath the surface of the islands; and the immense coal measures which are being worked on the west coast of the middle island promise to be one of its greatest and most permanent sources of wealth; while there is every indication that petroleum wells underlie a considerable area of the northern island, on which are active volcanoes, geysers, and hot springs possessing remarkable therapeutic properties.

The display of woolen yarn, tweeds, blankets, shawls, rugs, and hosiery, made by the Mosgrel Company, of Dunedin; of New Zealand flax, rope, and twine, by the Auckland Fiber Manufacturing Company; of native timber embracing a surprising variety of grains and colors, by numerous exhibitors, and of light and strong flour from Dunedin, Christchurch, and Invercargill, is significant of the activity of manufacturing enterprise in the islands; from which also are being annually exported large quantities of frozen and preserved meat, which finds a ready market in Great Britain. Although the trade is only in its infancy, it already returns $2,500,000 per annum to those who are engaged in it.

UNITED STATES.

In an international display of this kind, it will be perhaps more interesting to learn the impression produced by American exhibits and by the manner in which they are arranged, on the minds of others, than to offer any account of them myself. I have, therefore, collected from the Melbourne Argus, one of the leading journals of Australia, the following general description of this court and its contents:

The United States Court adjoins that of Germany in the Avenue of Nations. The main entrance is decorated with a broad arch in blue and gold and trophies of shields and flags. The leading features of the court are sewing machines, organs, and other musical instruments, carriages, chandeliers and lamps, tobacco, and beer, together with a large collection of the ingenious novelties for which Americans are famous.

The whole of the front of the court is occupied by the Singer Sewing Machine Company, who exhibit machines suitable for all grades of work and adapted to the purses of all classes of purchasers. Some of these exhibits are very handsome pieces of furniture of the cabinet kind.

The Wheeler and Wilson and the Davis sewing machines are also numerously displayed.

In the musical-instrument section, the Beethoven, American, Farrar, Otey, the Worcester, Miller, and Estey organ companies figure as large exhibitors. There is also a very fine display of watches by the Waltham, Elgin, and Waterbury companies, while the Seth Thomas Clock Company sends a noteworthy stand of clocks.

Tobacco is seen in every shape, bearing the brand of Allen & Ginter, Williams, Miller, and Hawkins, Taylor & Co., David Dunlop, Goodwin & Company, and other well-known manufacturers of this staple product of America.

Among the exhibitors of carriages and other vehicles are Dunne Bros., the Toledo Carriage Company, the Portland Wagon Company, and the Studebaker Manufacturing Company. The Anheuser-Busch Brewing Association, of St. Louis, exhibit a model, on a large scale, of their brewery, which is said to be the largest in the world, with railroad, trams and steam boats in motion.

The writer has omitted to mention, however, one of the most conspicuous features of the American Court, which arrests the eye of every visitor who enters it. I refer to the colossal mirrors in which are reflected the exhibits of the Singer Sewing Machine Company, rendered additionally attractive by an artistic arrangement of flags and a display of the fac-similes of the innumerable medals and trophies of honor which have been awarded to the company in all parts of the civilized world. In point of novelty and pictorial attractiveness there is nothing in the whole Exhibition comparable with the model of the brewery at St. Louis, referred to above. Its topographical position, its magnitude, and the immense extent of business transacted in an establishment of such imposing dimensions force themselves upon the attention of every visitor to the Exhibition, and at the same time convey a vivid idea of the gigantic scale upon which American enterprise conducts its operations, while the illusion of the scene so ingeniously depicted is heightened by its panoramic background.

The trophies, the model of the globe more particularly, exhibited by Messrs. Allen & Ginter, tobacco manufacturers, of Richmond, Va., and those of A. Cameron & Co. and W. Cameron & Bros., respectively, are well adapted to arrest the eye and to give increased publicity to products which are already well known and widely appreciated in the Australian colonies, where the consumption of tobacco by the population is very great indeed; it amounting in Victoria alone to 2 pounds per head per annum, although a duty of 75 cents per pound is imposed upon manufactured tobacco and of $1.50 per pound on cigars.

The American Waltham Watch Company, the National Cash Register Company, the American Elgin Watch Company, the Waterbury Watch Company, the Ansonia Clock Company, with its fine exhibit of art castings in metal, and the choice display of electroplated ware by Simpson, Hall, Miller & Co., of Wallingford, occupy the most prominent places in the main building, immediately under the principal dome and adjoining the entrance to the concert hall, the general point of rendezvous for friends and families visiting the Exhibition.

The pavilion in which Messrs Prang & Co., of Boston, display their beautiful productions is a highly attractive feature of the American Court. Those productions meet with a very large sale in Australia, where two branch houses have been established, in Melbourne and Sydney respectively, and I observe that the art critic of the leading journal has made the daintily delicate chromo-lithographs issued by this firm the theme of a highly eulogistic essay, under the title of "Art popularized," in which he points out the refining influences which must result from bringing into the homes of those whose means do not enable them to purchase good oil paintings or water-color drawings such admirable fac-similes of them as reproduce most of their salient characteristics.

It would have been difficult to present the agricultural resources and

products of the State of California more compendiously or instructively than is done by the samples of its cereals, so carefully selected and judiciously arranged in a handsome, carved oak frame by the San Francisco Produce Exchange, samples which elicited the admiration of country visitors more particularly. But "astonishment" would be the only word capable of expressing the feeling called forth by the aviary, tree-guards, lattice work, and other objects displayed by the Expanded Metal Lathing and Fencing Company, which has established an agency in Melbourne, where its fire-proof lathing and panel fencing are calculated to supply a want that has long been felt in the rural and pastoral districts of the Australian colonies.

The type-writers are hourly surrounded by curious gazers, who watch with the liveliest interest the rapidity and facility with which they are worked. As many as thirteen manufacturers of musical instruments are represented in the Exhibition, and the pavilions of the Beethoven Piano-Organ Company, of New Jersey; of Messrs. Mason & Hamlin, of New York; of the Smith Organ Company, of Boston, and of the Estey Organ Company, of Vermont, are among the striking features of the American Court. Nor must I omit to make special mention of an exhibit which, if more prosaic in character than the articles just named, appears to be peculiarly well adapted to meet the every-day requirements of the great mass of the community. I refer to the "Ideal Acorn Cooking-stove," manufactured by Messrs. Rathbone, Said & Co., of Albany, which has already firmly established itself in the public favor in this colony, and is perhaps equally well appreciated in the neighboring provinces.

In fact, it may be laid down as a general principle, I think, that the wants of a new country like Australia are much better understood in the United States, where the social life of the people presents so many points of resemblance to the social life of British colonists in this part of the world, than in the mother country. Nor is there that disinclination to adopt novelties here which the spirit of conservatism and dislike of change combine to inspire in the minds of a large section of the population of Great Britain.

The Australian, like the American, is called upon to confront exigencies and to adapt himself to circumstances with which the inhabitants of older communities are altogether unacquainted. And being unknown in the latter, the means of coping with them have never been considered, much less devised, by inventors and theorists. But in the United States these very exigencies and circumstances immediately set a hundred busy brains to work; and with what remarkable success no countryman of Howe and Remington and Edison, and no one who has ever visited the Patent Office at Washington, will need to be reminded.

Hence I would venture to suggest commercial relations should be cultivated with the Australian colonies, inasmuch as the United States can not only supply them with many articles and mechanical processes

for which there is already a certain demand, but can foster new wants by showing how to provide for the gratification and at the same time contribute to the ease, comfort, and material welfare of the great body of consumers in the United States of America.

CONCLUSION.

Financially the Melbourne Centennial Exhibition has been a failure. The balance sheet issued by the Executive Commissioners at the end of the year 1888, covering the transactions of five months and leaving only the month of January to be accounted for, showed an expenditure of, in round numbers, $1,700,000, irrespective of $1,250,000 disbursed in the erection of the main building, eight years ago, while the total receipts from all sources have only amounted to $350,000, which the takings for January may bring up to $400,000; so that there will be a gross loss of $1,300,000 on the undertaking. Nor are the causes far to seek. In the first place, the scale of magnitude on which the Exhibition was planned was disproportionately large, when compared with the population of Victoria; and, in the second place, the administrative body had had no experience whatever of what in the United States is called "running a show."

The expenses have been very great, and excepting the $110,000 disbursed on musical entertainments, with a direct return of $26,000 only, there was a conspicuous absence of side shows and auxiliary attractions. People grew tired of listlessly wandering up and down the main avenues; and in the absence of anything to divert them complained that the whole affair was "slow" and "wearisome."

On the other hand, the indirect advantages of all such industrial and artistic displays are considerable, but do not admit of accurate calculation; and inasmuch as the revenue returns of the colony of Victoria for the year just ended show a net increase of $7,000,000, or nearly 16 per cent. over those of 1887, the people can afford to sustain the loss entailed by the luxury of indulging in a Centennial Exhibition.

REPORT ON THE MACHINERY IN THE EXHIBITION.

By ANDREW SEMPLE, Esq., *of Melbourne.*

Among the many departments into which the Melbourne Centennial Exhibition is divided, there are none which approach in interest and importance those which are devoted to machinery and tools. This is by far the most varied and comprehensive collection of its kind that has ever been seen in the southern hemisphere, and perhaps the most instructive that has ever been got together in any part of the world, since every year witnesses the introduction of improvements in the designing and manufacture of machines and tools, and every succeeding exposition of the progress made in this direction must necessarily excel all previous displays of a similar nature. And truly the Exhibition now under notice affords, in the specimens of machinery and tools which it contains, endless matter for reflection, and unbounded scope for speculation. The fairly well furnished mind can trace in the objects here submitted for examination the whole history of civilization, from its early dawn to the high state of development in which we find it as the nineteenth century draws to a close, and can see at a glance the vast difference there is between the industrial arts, as practiced in the present day by progressive and cultured peoples, and of savage or semi-savage races. The bark canoe, or the "dug-out," of Polynesia, side by side with a steel-plated man-of-war, a submarine torpedo-boat, or an Atlantic passenger steamer, certainly presents an astonishing contrast, and quite as startling disparities are to be found in other departments of human inventiveness and industry. In the cultivation of the surface of the earth, to raise food for the sustenance of man, it was not until far down in the historic era that any more effective machine was used than a forked stick, its point held in the ground by one man while it was drawn forward by a number of other men, to scratch the ground and make the best kind of seed-bed of which the benighted agriculturists of Palestine and Egypt had any knowledge, while the resultant crop of corn or pulse was prepared for human consumption by being rubbed between the concave and convex surfaces of round stones by female manual labor.

See how similar work is done now, and by machines presented to view in this Exhibition. Starting with timbered or partially timbered coun-

try, as so many an American and Australian farmer has had to do in the past and still often has to do, we find here the several means of minimizing his labor, or of shifting it from his own to his bullocks' shoulders, or of rendering it a mere question of the carbonizing of wood and the evaporation of water (by the enlisting of the steam engine in his service). When bullocks are given the work to do, the principal roots of the trees are cut across, and then by means of chains and pulleys the animals drag them out of the earth. If stumps have to be drawn, they are plucked out by the roots by bullocks walking round in a circle, and operating a powerful screw, which compels the earth to loosen its hold and let stumps and roots escape from its grasp. When steam power is employed a little traveling engine is taken into the forest, with a crosscut saw attached, which can work either horizontally or vertically. In a few minutes it will cut through a tree that would take a good woodman a day to fell with his ax, and then, the branches having been sawn or hewn off, the engine runs along the main stem, its saw acting vertically, and cuts it into such lengths as may be desired. Then if the stumps are left standing, and the ground between cultivated, there are "stump-jumping" plows which do the work without any risk to their parts, as these yield when the implement meets with an obstruction which it cannot remove. At a later stage, when the land has been completely cleared, the ordinary plow comes into use, and in this we find a great variety of types in the Exhibition.

In the most improved English plow the mold-board is long and narrow, built on fine lines like a clipper ship; while the continental plow rather resembles the old-fashioned American implement, with a short and abrupt mold-board.

The comparative merits of these competing types is an open question. The English plow, working in clay or calcareous loam, scores the surface of a field with beautiful regularity, making on its face parallel lines as true as the lines on music paper; but it merely inverts the soil, while the blunter instrument not only inverts but also crushes the earth, and leaves it much more exposed to atmospheric influences, to be reduced to a fine tilth by the action of either heat or cold, and so prepared for the reception of seed. To economize labor and hasten work, double, treble, and multiple plows are used, by which a man and three horses can do the work of two men and four horses, or with four horses the work of three men and six horses. These are most valuable machines, enabling the farmer to get through his work quickly, and perhaps gain a crop when the season has been backward or otherwise unpropitious, and they require no more skill on the part of the workman than the single plow—not half so much as the old swing plow that was in use before wheels came in.

Many co-called "cultivators" here compete for the attention of the agricultural visitor. The Norwegian harrow, the clod crusher, the horse hoe, and many others are most excellent tools, but the recently

introduced disk harrow promises to take a more prominent place than either of them. It consists of two rows of cupped and sharp-edged iron or steel disks, which revolve upon shafts standing out from the main beam of the machine, and as they revolve they cut across the furrow-slices and throw the soil about in a way that goes far to reduce it to powder, if it is in a fairly friable condition, and the weather is dry and warm while the machine is at work. On stubble land it can be used without previously inverting the soil with the plow, and with a seeding machine attached it can get a crop in at one operation, leaving only a little work to be done after it with the roller or common harrow. In this way a second or "snatched" crop can often be secured in the favored climate of Australia. Next come harvesting machines in great variety. A peculiarly Australian apparatus is the "stripper," a rather wasteful machine, since it leaves the straw behind to be consumed with fire or plowed in. But it is found very useful here, where there is little house feeding of cattle, and straw is of little value except in the neighborhood of cities. The "stripper" catches the standing crop with its fingers under the ears, nips them off, and thrashes out the corn in a beating apparatus with which it is provided. In its most improved form it separates the chaff from the corn, and delivers the crop into bags ready for the market—an admirable machine which did much to build up the agriculture of Australia, since in the early days, in South Australia, it enabled the then struggling farmer to grow wheat for exportation at a profit, but one that scarcely lends itself to high farming, economically practiced.

Reaping and mowing machines are well represented, and many of these are of the highest merit; but the reaper and binder is now *the* harvester. It is in general use in Victoria, and within a few years it will probably be in universal use except on small holdings that cannot afford so expensive a luxury.

An important novelty in farming is here well represented, namely, the ensilage system. This is generally known to be a method of preserving forage without desiccating it; of preparing it so that it will keep for many months without depriving it of its natural succulence or sap. It is a little difficult to see how ensilage can be more nutritious than hay, which has lost nothing but water in the drying, but there is a mass of evidence before the world which compels the belief that it is more nourishing. But even if it were not, there would still be much to be said in favor of this method of treating herbage. Hay can only be made when the sun shines, while ensilage can be made at any time, and that either in under-ground pits or in stacks on the surface. In either case the essential point is to compress it, either by means of weights or screws, or of rope and windlass, so as to expel all atmospheric air and keep it out. Farmers who have experimented with the silo tell us that food prepared in it is eaten greedily by stock of all kinds, even by pigs and poultry, that would not touch hay; and it must be more ready

of digestion than dried forage, by reason of the fermentation which it has undergone in the pit or stack. Judging by appearances the ensilage system has already established itself in the routine of the Australian farm, and is likely to have an increasingly important place in it in the future.

The Exhibition fully illustrates the further processes which the fruits of the field undergo before they are ready to appear upon the tables of the rich or poor. Milling machinery is shown in great abundance, with revolving stones and rollers for the grinding tools, and disintegrators, sifters, and other contrivances to separate all foreign substances, or alien grains and seeds, from the wheat, in the first place, and all impurities from the flour or meal in the second. Then the resulting material is converted, under the visitor's observation, into biscuits for the forecastle mess, or into the most delicate and refined of macaroons and ratafias, to stimulate the jaded palate of the chronic dyspeptic, not to speak of good plain household bread and French rolls. The whole process of conversion is here made plain to the dullest comprehension, nor is there anything to be observed in the process of cooking that would lessen the enjoyment of the most fastidious partaker in the food seen in course of preparation, for everything is done by machinery, or nearly everything, and there is seldom direct contact of the human hand with the materials in use.

Still treating of food substances and manufactures, there are two dairies or creameries in the Exhibition, one on a scale suited for a farm of thirty cows or so, and the other for a manufactory to which four or five hundred cows' yield is supplied. The systems here shown and taught are of American origin, and there is certainly a fine field for them in Australia. The great city of Melbourne, excellently supplied with most of the other necessaries and luxuries of the table, is poorly supplied with dairy produce. Fresh butter is so irregularly supplied and of such widely varying quality that it fluctuates in price between sixpence and two and sixpence per pound, the cheaper article being made out of as good milk as the dearer, the vast disparity in value arising entirely from difference in treatment. And more than this, it is not always that fairly good, fresh butter is to be had at any price, so inadequate are the arrangements for keeping over the surplus of one season to supply the deficiency of another. In the Exhibition model dairies, farmers and farmers' wives may learn, who care to do so, the whole simple mystery of butter-making and preserving, to their own great gain in money and to their customers' great gain in comfort. Fresh milk is delivered at the Exhibition dairies every day, and that which is intended for butter-making is "separated." The cream is then churned, and the resulting butter worked and made up into rolls and prints in view of the public, who may purchase the produce if they choose, at shop prices, or tumblers of whole or of "separated" milk, and so have proof of the genuineness of the whole transaction.

When cheese is to be made, that, too, is done from start to finish with American machines, in presence of the public, and lectures are delivered at stated times in explanation of the several processes of manufacture. The made cheeses are stored away in a heat-proof apartment built of bricks manufactured on an American plan and called "terra-cotta lumber." They are made of a mixture of clay and sawdust, and are perforated from end to end by two little passages or tunnels through the length of each brick, which induce a current of air through the walls into which the bricks are built, while separately they are impermeable by either cold or heat. In this chamber the cheese is left to ripen and mature in a constantly equable temperature.

Of cooked and canned meats there is a considerable display from the different Australian colonies and New Zealand. In canned fruits very little is done in Australia at present, but the business has been commenced, and is likely to grow into large dimensions, for the soil and climate of Australia are so varied and for the most part so good that fruit and vegetables of every description can be grown to the greatest advantage, from pineapples and bananas in Queensland, to black currants and savory cabbages in Tasmania, and grapes almost everywhere. There is only one fruit and vegetable desiccating establishment represented in the Exhibition, and it works upon American methods, with excellent results. The workmen employed have always around them a group of interested spectators, and no doubt the seeds of knowledge on the subject of their processes, which the Exhibition Commissioners are sowing so liberally, will bear abundant fruit in due course. Another form in which farm produce is prepared for the consumption of the public is exhibited by means of a model brewery that is to be seen at work in the Exhibition. In it the German method of low fermentation is followed, and an excellent beverage produced, which the public are privileged to sample. Malt only is used in this brewery, though in the beer manufacture of these colonies a considerable portion of sugar is used in conjunction with malt. The bitter principle used in the manufacture is derived mainly from English hops, for though hop cultivation has been introduced into the colonies it has not succeeded so well as to render them independent of foreign supplies. Several sweetmeat manufacturers are constantly at work turning out sugar confectionery in all its varied forms and qualities. Candies, lozenges, "mixtures," and innumerable other kinds of children's dainties, founded on European and American models, are constantly being finished off, and are disposed of to admiring crowds of young people with a rapidity which finds neither check nor hindrance except in the rapid emptying of their pockets.

Other farm machines are shown in the form of drain-opening plows, subsoil and vineyard plows, drain-tiles, mortising machines for the preparation of fencing posts, wire strainers, and a rich multifarious collection of vignerons', orchardists', woodmen's, and wool-growers' hand-tools. Human ingenuity and patience would seem to have been taxed

The tram-cars bring most of the visitors to the Exhibition and take them away again. Specimens of the winding machinery and of the cables are here on view.

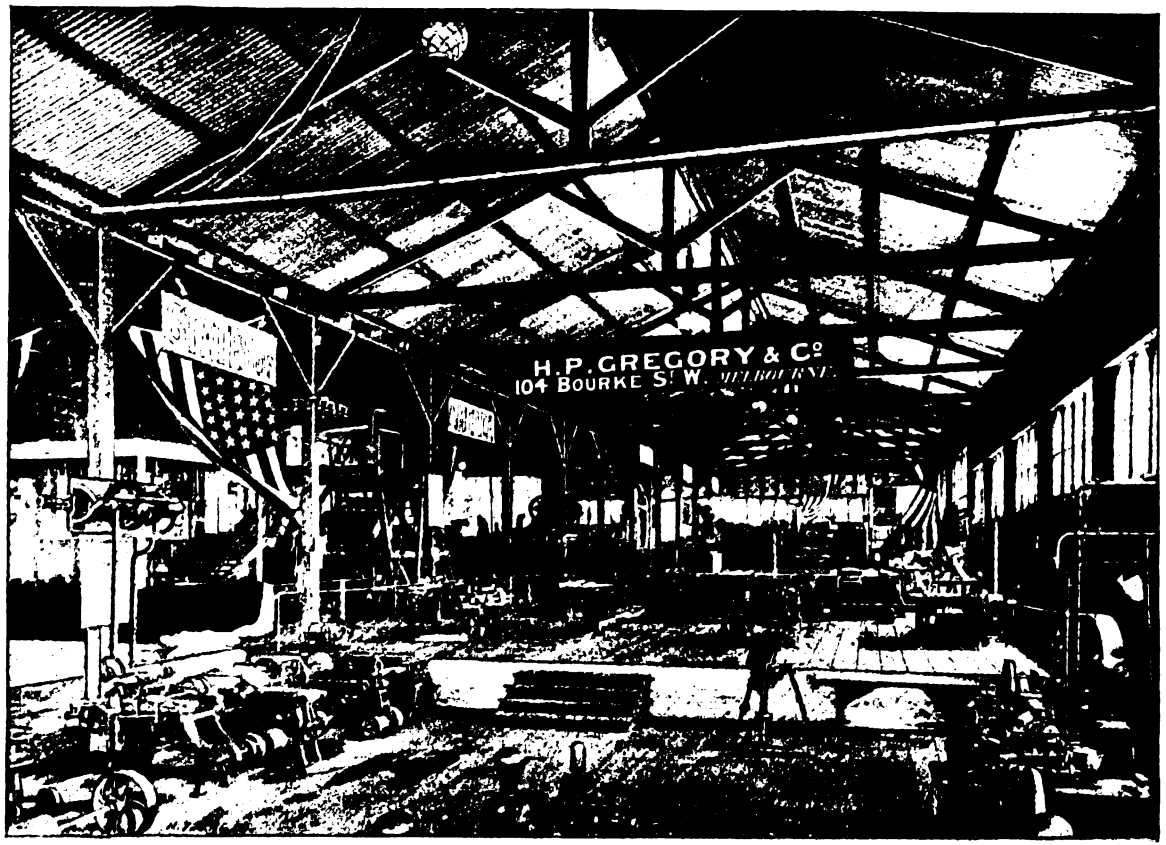
In timber-treating machinery there is an excellent display. On one hand are to be seen vertical and circular saws capable of dealing with logs of 4 feet in diameter, while on the other delicate fretwork is being produced by means of endless hand-saws. Besides sawing in all its varieties, planing, molding, boring, etc., are executed by the machines to the admiration of all interested on-lookers.

The manufacture of malleable-iron pipes is carried on extensively in Melbourne, and for this industry Australia is indebted to the United States. These pipes are only about a fourth of the weight of cast-iron pipes of a similar capacity, and since they are paid for by the ton at about the same price as cast-iron, a great saving naturally accrues from their use. Besides, they can be laid in a much cheaper pipe track, since they have only one joint in 35 feet, whereas cast pipes have one in every 7 feet. The new pipes are found very valuable in the reticulation of cities for water-supply purposes, in irrigation works, etc. Specimens of the pipes are on view in the Exhibition, and the process of their manufacture is explained to all interested in the subject.

But perhaps the most valuable of the machines on view in the Exhibition are those whose function it is to make other machines. Of these it may be said that they reproduce themselves with a rapidity that is only limited by the public's need of machinery and ability to pay for it. Prominent among this class of machines are turning lathes, of beautiful construction, automatic in their action, and as exact in their operation as the finest of mathematical or astronomical instruments; also there are boring, planing, chipping, and screwing machines, and tools which deal with iron and steel in the most arbitrary manner, rendering them as amenable as clay in the hands of the potter.

To this cursory sketch of the machinery exposed in the Melbourne Centennial Exhibition detailed accounts of some of the more practically important sections of the collection will be added. In the mean time it may be said here that the Commissioners have made as liberal provisions for the proper display of the machines committed to their care as other demands upon the space at their disposal would permit. As new demands for space came in they erected additional temporary annexes to the main building, until the 40 acres of ground under their control were almost entirely walled and roofed in.

The Commissioners also supply steam power to run the machines seen in operation from noon to 9 p. m. every working day. They have ten engines employed at this work, of an aggregate horse-power of about 2,000, with of course boilers capable of supplying the required steam. The engines actuate a revolving overhead shaft of about 2,500 feet in length, and each exhibitor connects his own machine with this by means of belts and pulleys, tapping it and drawing off from it as much driving



UNITED STATES MACHINERY COURT No. 1. (MACHINERY IN MOTION.)

power as he may require. And in addition there are a great many gas engines at work, each working the machine with which it is immediately associated, and several exhibitors' engines and boilers, whenever the display of these is important to the owner.

WOOD-WORKING MACHINERY.

Australia is abundantly timbered, the great bulk of its forests consisting of different varieties of eucalyptus and acacia. These supply, each variety having its own specialty as a timber tree, most excellent wood, heavy, close-grained, and durable, but hard and difficult to work, differing in these respects from the red and white pine of America. The Australian timber is, however, for the most part comparatively easy to split, whether into posts and rails or shingles, and the experienced splitter can tell by cutting a notch in a tree whether it will lend itself readily to his purposes. In some parts of Victoria the trees attain to an enormous size. Within 30 or 40 miles of Melbourne there are specimens standing 300 feet high, which are only exceeded in height by some growing in the forests of America. The Victorian timber has proved invaluable to the miner for the lining of his shafts and drives; to the farmer for fencing and house-building, for implement and wagon building; to the whole community as fuel, whether for domestic use or for steam-raising. It has also been much employed in the construction of bridges, wharves, jetties, railways, and other public works. For ship-building, too, and in cabinet-making it is excellent, though costly to work. Some of the varieties have beautiful natural markings, and are capable of receiving a high polish, producing fine effects in furniture manufactures. As is usual in countries where trees are many and workers few, the forests of Victoria have been most wastefully treated. A practice prevails of "ring-barking" the trees, and leaving them to die of inanition, with the effect that great tracts of country are constantly being met with which are encumbered with dead and dying trees, stretching their gaunt limbs abroad until they yield to the slow process of decay and fall. When trees are wanted for the mill they are cut a good way up from the ground to save labor, and the stumps left to send up suckers and reclothe the earth with verdure, but of a useless description. The fallen trees are cross-cut into logs and drawn to the mill by bullock teams, then broken by a vertical saw, and ultimately reduced to the required dimensions by means of circular saws. In marked contrast with this rough-and-ready process are the methods of timber treatment, and the machines employed therein, in America, as shown in the Exhibition. Messrs. Parke & Lacy, of San Francisco, H. P. Gregory & Co., Frank & Co., of Buffalo, H. Disston & Sons, of Philadelphia, A. Fay & Co., of Cincinnati, Ohio, and others have wood-working machines on view, and partly in operation, which are a revelation to Victorian saw-millers and timber-treating-machinery makers, although, indeed, they had some knowledge of American sawing machinery before, through seeing

it at work in the saw-mills of Melbourne converting Canadian logs and deals into the scantlings in use here. The use of the hand-saw in heavy work was new to most visitors, and excited much interest, as did also the beautiful planing, mortising, slotting, and boring machines. Enterprising machinery-importing firms in Australia have undertaken the agency of several American machinery establishments, and no doubt a trade will spring up in such goods between the two countries that will prove advantageous to both. A Victorian machinery firm, and also a Canadian firm, have on view a circular-saw bench provided with two saws, one cutting from above, the other from below, so that the cutting tools need be only half the diameter that would otherwise be required to perform the same work, and the sawing is done in much less time. Some American planers that smooth the upper and lower surfaces of the wood treated, at one operation, were much admired, as were also the American door and sash making machines shown.

Throughout the Exhibition building there are many small expositions of wood-working machinery in operation. Turning, circular and ribbon sawing, molding, carving, engraving, and, in short, nearly everything that can be done with wood by means of ingenious machines skillfully handled is here to be seen, and the various processes afford the best kind of object teaching to the crowds (consisting largely of boys) who stand by and observe them at work.

PRINTING-PRESSES, ETC.

Of printing and book-binding machines, worked by manual and pedal labor, there is a great variety in the Exhibition, colonial and foreign. Of steam-propelled machines there are two, one of which is the Marinoni, a French platen machine, which shows beautiful workmanship, but is not adapted to fast newspaper production. The other is a Hoe machine, imported by the proprietors of the Argus and Australasian, who have already in use many Hoe machines, of which the one in the Exhibition is the most improved example. It feeds itself from a continuous roll of paper, prints first one side and then the other, cuts the paper into copies, folds and reckons them, and finally delivers them ready for sale over the publishing-office counters. It is to be seen at work at intervals by visitors to the Exhibition.

RAILWAY MATERIAL.

Some particulars have already been given of the railway necessaries in the Exhibition, and this collection is very comprehensive, including everything, from nuts, bolts, and rivets, on the one hand, to locomotives of 40 or 50 tons in weight, and luxurious carriages for the long night journeys between Melbourne and Adelaide, on the other. There are no really long journeys here, in the sense in which the phrase is used in America, but to minimize the inconvenience of even a sixteen hours' run the Australians have adopted some of the American modes of travel,

UNITED STATES MACHINERY COURT No. 2. (MACHINERY IN MOTION.)

including the beautiful boudoir car, which is highly appreciated by travelers between Melbourne and Adelaide; but they have yet much to learn on the subject, as their foreign visitors are constantly reminding them. The "Thompson-Houston" electric tram-car, which is constantly running in the Exhibition grounds, is the first thing of the kind that untraveled Victorians have seen, and the smoothness and noiselessness with which it runs are warmly commended. It is in contemplation to introduce the electric tram in Ballarat and other inland cities, but the cable system works so admirably in Melbourne that there seems to be little chance of its being displaced. The electric tramway (the Thompson-Houston) dates from 1883, and claims to be the most successful in the world; as is shown by the number of companies now using it. In January, 1888, it had in full working order 343 central stations, aggregating 42,907 arc lamps, and 110 stations using its incandescent system, with 65,500 lamps. It is in extensive use in Great Britain, in government and other establishments, and has never been discarded in favor of any other system when once it has been introduced.

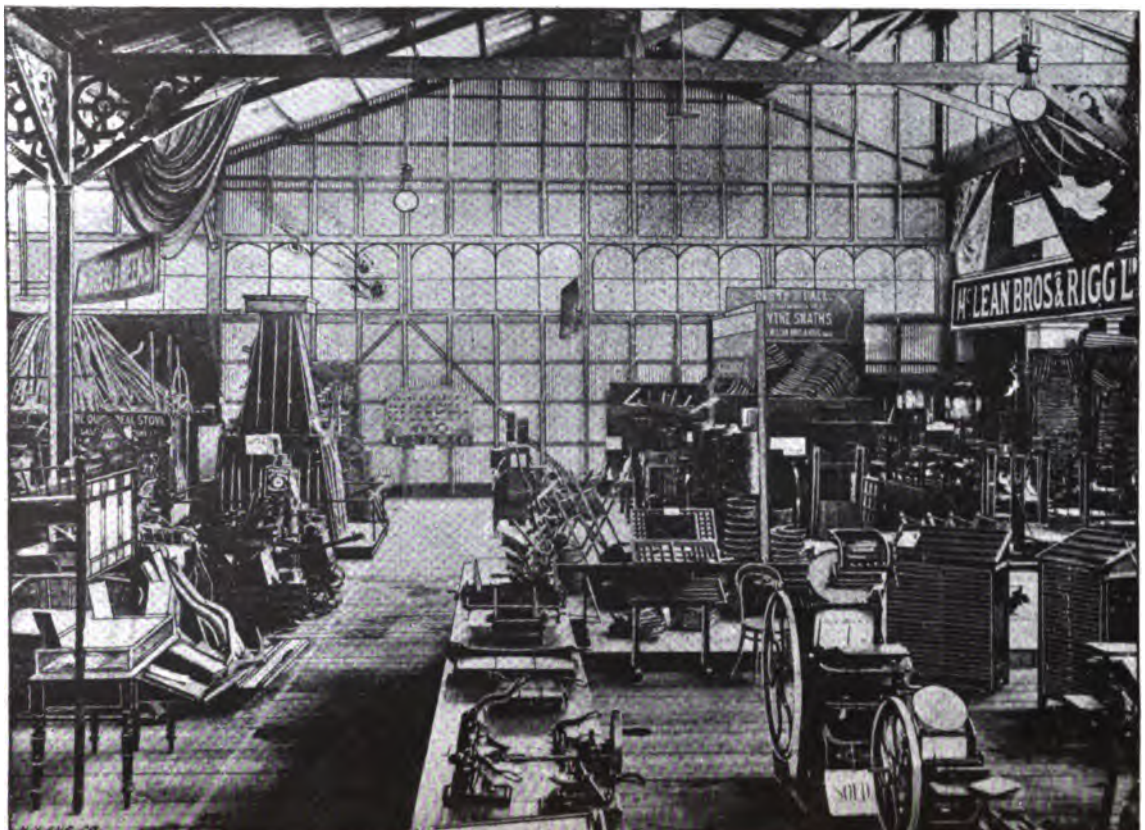
MISCELLANEOUS.

The Electric Supply Company, of Chicago, Ill., the Electric Motor Company, of New York, and the Western Electric Manufacturing Company, of Chicago, are large exhibitors of dynamos, telephones, switchboards, and other similar goods, all of acknowledged excellence in design and workmanship. The Westinghouse Continuous Brake is here exhibited, as used on the Victorian government railways, and also McKenzie & Holland's signaling and interlocking apparatus. Fairbanks' (American) and Avery's (English) weighing machines, for railway-truck weighing, corn weighing, etc., are here in great variety, and it is claimed for both kinds that they can give an accurate account of anything committed to their arbitrament that is ponderable, within the limit of 100 tons and the ten thousandth part of a grain. New cattle and sheep trucks of colonial manufacture are shown, the aim of the improvements in some of them being to load up at their ends, so that a procession of half-tamed beasts may be marched in from one end of a train until it is full, the trucks communicating with each other by means of doors or gates. In practice these trucks have been found to work well, facilitating the loading of cattle and minimizing the risk to which they are exposed in transit.

AGRICULTURAL MACHINERY.

In the several departments of the Exhibition are to be found a very complete exposition of farming machines, implements, and tools, of foreign and colonial make. Of Victorian manufactures in this class, the plows are very finely constructed, and beautifully finished, single and multiple furrowed plows, draining, vineyard, and subsoil plows, seed-

ing and turn-wrist plows, etc. The harrows, cultivators, hay rakes, rollers, and other aids to good husbandry are excellent, as are also wagons, hay carts, broadcast and drill seeders, etc. Chaff and tobacco cutting machinery is well represented. From New South Wales, South Australia, Tasmania, and New Zealand there are excellent machines in this class, but the more important are from Europe and America. The great English manufacturing firms are splendidly represented in portable thrashing machines and engines. Here are to be found the celebrated Buckeye mowers and reapers and binders, manufactured at Akron, Ohio, and shown by Mr. H. S. Chipman, of Sydney. This latter machine is a competitor at the annual field trials with the McCormick machine and three of English make. The performance of the competing reapers and binders is all good, so that there is little to choose between them. Messrs. Clayton and Shuttleworth, of London, Corbett, of Shrewsbury, Hornsley & Sons, of Grantham, Ransom & Co., of Chelsea; Ransome, Simms and Jeffries, of Ipswich; Robey & Company, of Lincoln (all English); and Massey, of Toronto, are to the front with thrashing-machines, which put through 100 bags an hour ready for market, and up to double that quantity with greater steam power. These are beautiful and powerful machines. In all less important machines the firms enumerated and many others are large exhibitors. In the American Agricultural Machine Section are the W. A. Woods mowing and reaping machines and reaper and binder, the latter being also a successful competitor in field trials and a favorite with the farming public. The Massey manufactures are of marked excellence and are much admired. Some American-made implements shown by Mr. W. Fleming, of Sydney, are rendered attractive by the novelty of their construction no less than by their obvious merits. Messrs. David Bradley, Wheeler & Co., of Kansas City, Mo., show "sulky" plows and "gangs" with two, three, or four mold-boards on three wheels, and to be ridden by the plowman. An unskilled hand can manage them; they turn up furrows of 16 inches and pulverize the earth at the same time, equal to rough harrowing, as can easily be understood on inspection of their short and abrupt mold-boards. The sulky is said to turn over 3 to 3½ acres a day in the hands of a boy of from thirteen to fifteen years of age. Such implements and such boys and men would soon make the fortunes of Victorian farmers. The Bradley "listing" plow, with "corn-drill attachment and subsoiler," is another wonderful implement. It sows corn by dropping the seeds through holes at any distance apart that may be desired, and also sows, hills up, and digs potatoes. It is of course a double mold-board implement. The Buffalo Pitts threshing machines, the Osborne harvesters, reapers, and mowers, and Henry Beech's (London, Ontario) three-furrow-gang-plows are all most capable-looking. The Johnson ensilage stack system is illustrated by means of models in the Exhibition, and a stack of fodder in the yard preserved in a sweet condition.



UNITED STATES MACHINERY

The system has been tried at the Agricultural College of Victoria, and is reported to have proved entirely successful. The advantages of the system are that it saves the cost of pits and is easier to feed cattle than moist pit ensilage, while milk yielded by cows fed upon it makes perfectly sweet butter. It is not so eagerly eaten by stock as the moist subacid ensilage of the pits, nor is it shown that it yields as full-flavored or as much butter. Everybody enjoys sweet, fresh butter, but there are not a few who enjoy a stronger butter more. In fencing wires, of English and American manufacture, there is a good display.

Of what may be considered minor agricultural machines, but are nevertheless highly useful, there are a great many in the Exhibition. Wool-presses worked in various ways are very prominent, and a two-storied one, by which the compressing is done by the enormous force of a fine-threaded screw, seems to be most prized in Australia. The upright box, which is first hand-pressed till it is full of wool, has an upper and a lower half, and when the whole of its contents have been squeezed into the under compartment by the action of the screw, a bale of 250 to 300 pounds in weight remains in the lower. Other wool-presses are worked by levers and pulleys. Wool washing and scouring machinery is also well represented. Compressors for other farm products are numerous. There is a French apparatus that will reduce a load of hay or straw to the dimensions of a beer barrel; a German bran-press that reduces the material intrusted to it to a seventh part of its original bulk, and turns it out in the form of cakes or slabs; and chaff baggers that shrink the chaff to about a fourth of its former size. All these are valuable economizers of freight. Of dairy utensils there are many, chiefly of American patterns, as has already been seen. Prominent among these are milk-coolers, for the Australian farmer has been taught by American experience that the keeping properties of milk are greatly improved by depriving it of its animal heat immediately on its being drawn from the cow. The favorite cooler is one borrowed from the brewery. It has a series of horizontal tubes, in which a stream of as cold water as can be obtained is kept up, and the milk trickles down the outside of these pipes until it is reduced from 90 to 60 degrees. Special trucks are now being made for the conveyance of milk and other perishable commodities on the state railways, and heat and cold proof chambers are being erected at many stations for their reception, so that soon there will be a marked improvement in the food supply of Melbourne and other cities.

Many varieties of the incubator here compete for the attention of visitors, some using dry and others moist heat, the heat used being obtained by the combustion of petroleum. But with all of the incubators it is necessary to turn the eggs every day, by hand, and individually, although machines have been invented elsewhere by which a whole trayful or stratum of eggs is inverted at one operation. The incubator exhibitors describe and explain their process, and in such glowing terms that many who hear them regret that they are not poultry farmers.

Bees and their management are fully illustrated by means of houses or hives of strange construction, accompanied by bee-feeders, honey-extractors, purifiers, etc., all of which are carefully studied by interested visitors.

SHEEP-SHEARING.

A novelty in sheep-station appliances is shown which promises to effect an important reform in the process of wool producing. The wool-growers of Australia have long been subject to inconvenience and loss through the difficulty they have experienced in securing the necessary force of skilled workmen at shearing time, but an ingenious member of this class, Mr. F. Y. Woolsley, has provided what is likely to prove an effectual remedy in the shape of a sheep-shearing machine. It took him ten years to perfect his invention, and at last he has got it extensively introduced and with the best results. Its operative parts resemble those of a reaping-machine. A comb with eleven blunt teeth, which is a segment of a circle of 3 inches in diameter, is pushed along the sheep's skin to raise the wool, and is followed by a cutting tool with three teeth, a segment of a circle of ¾ inch, and this snips off the fleece by a reciprocating action, taking all the wool and leaving neither tufts nor ridges to lessen the weight of the clip. The animal can be shorn as bare as is desired, and when closely clipped presents a beautiful pink surface without cuts or gashes. In an experimental trial of the machine large-bodied merino wethers with three or four months' growth of wool upon them were shorn clean in four minutes each, while similar sheep hand-clipped were put under the machine and yielded 8½ ounces more wool per head than they had already yielded to the hand-clipper. An unskilled workman can be taught to manage the apparatus in a few hours, or days at the outside, and an 8-horse-power engine can run one hundred machines. The cost of them is about £10 each.

EXPANDED METAL.

Of all the mechanical triumphs in which this Exhibition is so rich there is nothing to surpass the so-styled "expanded metal lathing and fencing manufacture," which converts thin plates of soft and pliable metal into perforated webbing, suitable for lathing, fencing, and many other common and valuable purposes. The process is the invention of J. F. Golding, of Chicago, Ill., whose patent rights in it have been secured, so far as these colonies are concerned, by a Melbourne company. The machine employed is nearly automatic in its action; it performs its functions with the utmost regularity and precision; the working of it does not involve the slightest waste or loss of material. It has always an admiring crowd of lookers on when it is in operation, and none are more delighted with its performance than engineers, iron-workers, and others who know how to estimate it at its true value. The material on which it is seen at work in the Exhibition is soft steel, of

20 gauge, in plates 7½ inches broad and 10 feet long, which it converts into fencing of 3 feet 6 inches in depth, or lathing of narrower size, the fencing consisting of diamond-shaped meshes of 1½ inches by 1¼ inches. The lathing consists of smaller meshes, oblong in shape, and in both cases the meshes have two points of contact, at which the metal is continuous. Driven by a 6-horse-power engine, the machine finishes a 10-foot sheet in a few minutes. The completed sheet or web has the thickness of the original steel plate at right angles with its length, and the expanded 20-gauge metal, now reduced to a thin edge, in the direction of its length. The result is that the fence offers the very slightest opposition to the passing through of light and air (or wind), while the cutting knives which it presents to the noses of straying beasts puts a sudden check to all attempts at intrusion. A great merit of the lathing made by the machine is that it is fire-proof, and with fire-proof plaster would make a wall almost wholly incombustible. The lathing, too, neither shrinks nor warps, so that the plaster keyed to it is safe against crack or fissure, with the effect that walls and ceilings so constructed are certain to be long-lived. To properly understand the action of the machine it must be seen at work, and it is not always nor easily understood then. It has two massive dies or hammers, one with sharp cutting edges, the shape and size of the perforations to be made, and this coming down upon the sheet with great force makes the desired opening; but the cutting tool is not complete all round. At one corner there is a little gap in its face, and the metal corresponding to this remains intact, to form the connecting links between the meshes. The other die, following, expands the metal and draws it along to receive the succeeding impact of the cutting die. It may help to an understanding of the fencing made by this process if one imagines a piece of herring net in a lax condition as the original plate of steel, and the same net under tension as the finished product, or "expanded" metal. The machine is a beautiful and effective one, and should prove a valuable addition to the mechanical resources of the colony, rabbit-afflicted as it is. The price of the finished products of the machine is quite moderate, and will be no check to their extensive use.

MINING MACHINERY.

Australia resembles America in possessing in great abundance the natural substances which can be turned into wealth by man's labor, and among the most important of these are its mineral resources. In all the continental colonies, as well as in New Zealand and Tasmania, gold is found, and in some of them there are immense deposits of copper and lead and silver ores. In New South Wales, Tasmania, and New Zealand, coal in workable seams is found—in the first named in beds of great extent and depth. So important are the New South Wales collieries that during the period covered by the Melbourne Centennial Exhibition a strike among the coal miners there seriously inconven-

ienced the manufacturing, shipping, and gas-lighting interests not only of Australasia, but of India and China as well. Even in the State of California the effects of this strike were felt, for in a normal condition of trade there is a considerable exportation of coal from New South Wales to that State. Here the price of illuminating gas suddenly rose from 5*s.* 4*d.* to 8*s.* 6*d.* per 1,000 feet; steamers were thrown idle; factory chimneys emitted smoke in greatly reduced volume, or not at all; hundreds of ships lay idle in the harbor of Newcastle (N. S. W.), waiting for loading, and a general paralysis of trade seemed imminent. But fortunately the strike ran itself out before any very serious injury had been suffered.

In Victoria coal has not yet been found in seams that it would pay to work. It has been searched for by the sinking of shafts and putting down of trial bores, any time these thirty years, and good enough coal found in many places, but always in veins that were too thin to be commercially valuable, unless with the aid of railways running to the pits' mouths. These are likely to be supplied soon. Of other valuable minerals, Victoria possesses many varieties, but by far the most important is gold. So important a factor in the prosperity of the country is deserving of attention, and it will render the gold-mining industry of the colony, as illustrated by machinery in the Exhibition, more easily understood, to explain how it is carried on at the more extensive of the mines of the colony at the present time, choosing the Port Phillip Company's works, at Clunes, as an example. This company commenced operations in 1857, on private property, paying the owners of the land a royalty on the gold obtained. During the first twenty years of its operations it treated 914,000 tons of its own quartz and 41,115 tons raised by tributers working within its boundaries on terms. The profit that accrued amounted to £365,166, of which the owners of the land received as their share £123,165. In one year the company crushed 69,319 tons of stone; the highest average for a year was 1 ounce, 9 pennyweights per ton of quartz, and the lowest 7 pennyweights, 23 grains. The smallest yield that pays the company is 4 pennyweights. The country worked in is basalt of various depths, ranging to 100 feet; then quartz intermixed with other minerals, so far as the ground has been explored, namely, from 900 to 1,000 feet. When the mine is in full work 400 men are employed. In the Exhibition is to be seen quartz mining and raising machinery of the most efficient descriptions in general use in Victoria.

The stone-breaker is a valuable adjunct of the battery, breaking the quartz into manageable lumps by a kind of pinching action, at the rate of about 10 tons an hour, with an 8-horse-power engine. In the stamping battery some improvements are observable. The steel faces of the stamp are now more easily replaced, and revolve so as to wear evenly; their adjustment has been simplified, and they can readily be given any required length of drop, from 4 to 9 inches, according to the character

of the stone under treatment; and a new machine (Mr. McLean's) has been introduced for raising the stampers, which claims to be an improvement on the old. The "cam" is a mass of iron, in shape something like a reaping hook, and this, revolving upon its shaft, insinuates itself under a boss or shoulder on the shank of the stamper, raises the stamp as the cam-shaft revolves, and drops it from its outer extremity, with some grinding power still remaining in it. The McLean machine that has been introduced to displace this arrangement has an overhead revolving circular table, of iron, on the periphery of which are inclined planes of steel, which gradually raise the stamps as the table revolves, and drop them from the highest point in the plane. This, too, can be readily adjusted to determine the value of the concussion, and it is said to be cheaper to construct and more economical in the working, besides possessing other advantages over the stamp elevator now in general use. Another Victorian crusher consists of two revolving metal disks, between which the stone is fed, and as the disks approach closer and closer to each other from the upper to the under limit of their orbit, the grinding is effected by degrees. The machine is composed of parts individually light, and it is claimed for it that it is easy to transport and erect, and valuable for prospecting operations in hilly or thickly wooded country. Messrs. Parke & Lacy, of San Francisco and Sydney, represented in the Exhibition by their general manager, Mr. L. A. Kimball, make a very fine display with their quartz crushing and concentrating machinery, and other machines to economize gold-getting on a large scale. This is a collection which has a large and prominent place in the American Machinery Court, and is constantly attended by visitors to the Exhibition who feel interested either in gold mining or in mechanical invention. The plant they have on show comprises a stone-breaker, the "Challenge" ore-feeder, a Huntington centrifugal roller quartz mill, and the Frue ore-concentrators and vanning machines, all arranged to work in connection with each other, and requiring the attendance of only two men, one to feed the ore into the hopper of the stone-breakers and the other to attend to the engines and concentrators. The stone, having been broken into lumps of about an inch in diameter, is carried to a centrifugal crusher, where it is reduced to any required degree of fineness, as is determined by the nature of the grating the ground stone has to pass through. The pulp then passes over silvered copper-plate inclined tables, on which gold that has escaped from the stamper boxes is caught by quicksilver, forming an amalgam. From the end of the tables the stream is divided and directed by means of spreaders. Each concentrator has a revolving endless rubber belt, and this revolving towards the upper end of the incline, the pyrites or other heavy particles falling upon it are carried forward and collected into a trough of water, while the lighter particles of quartz or gangue are swept backwards by the water, a vibratory side motion in the machine assisting the separation. The apparatus

admits of being readily adjusted to separate from the mass any minerals that are lighter than the bulk. It is claimed for the Vanner machine that it practically saves *all* the pyrites, and this we have certified to by the Geological Surveyor and Chief Mining Surveyor of New South Wales. The Huntington roller quartz-crusher, shown by the same firm, is an iron pan, or tub, 3 feet in diameter and 2 feet deep, with a ring die running round it, inside. In the pan are three steel rollers, freely suspended from iron arms. When the arms are made to spin the balls fly out, and revolve against the ring die, and pulverize the quartz, which is impelled by centrifugal force against the ring. When fine enough the disintegrated stone, with water, escapes through gratings placed just above the ring die. Quicksilver is put into the mill to amalgamate the free gold that sinks into it, but does not come into contact with the rollers. This mill and two concentrators treat 12 tons of stone in twenty-four hours. It has been five years in use, and it is certified on its behalf by mine managers and other responsible men that it is easy and cheap to transport, to erect, and to work, and gives excellent results. The "Challenge" ore-feeder has for its main principle the obvious truth that stone crushes most readily when attacked on both sides—that is by a hard beating surface acting on it in a thin layer of the material to be reduced instead of pounding it in a deep mass, when the stone slips and eludes the stamped face.

Feeders of the improved kind are shown, and their superiority is recognized at a glance. Another of this firm's exhibits is "Wall's Improved Crushing Rolls," for the crushing or granular pulverization of gold and silver ore and copper matte, which claims to have double the crushing power of any other roller crusher in use, while its parts are much more durable; also it obviates the production of slime, reducing the material to a uniform granular pulp. The makers of this machine challenge all other makers to a competitive trial on the basis of all claims made on behalf of their machines. The "Wall" differs from the Cornish and other roll crushers in the construction and arrangement of its crushing faces, which consist of series of parallel corrugations, which extend across the faces of the shells, and are so fitted to each other that when revolving every point in the surface of each will press equally upon the corresponding parts of the opposite roller, and be firmly held there by steel gear; the slipping of the crushing faces is thus rendered impossible. In the common Cornish rolls the operative faces are straight and smooth, in marked contrast with the Wall roll, and it is obvious that with the latter a much greater grinding surface is brought into contact with the ore, while the angle of incidence so varies that if there is a weak part in the lump, or a tendency to cleave, the machine will find it out. For pan or plate amalgamation, it is alleged that three pairs of the Wall rollers will give a greater product than forty stamps, requiring only one-fifth the driving power, and costing in original outlay less than one-fifth, while the cost of wear and tear will be a mere fraction.

The machines are manufactured at the Eagle Foundry, San Francisco, and important portions of them at the Pittsburgh Steel Company's Works, Pennsylvania.

Reverting to colonial machines, Watson & Denny's amalgamating pan and slime concentrator is a machine which has come into extensive use in Australia. Its "great advantage is the extremely low cost of treating large quantities of auriferous and argentiferous ore." It is claimed for it that by its means nearly all the gold and silver contained in pyrites and tailings can be saved at a cost of less than three shillings per ton of stone treated, one machine reducing to slime all the material produced by a five-head battery. The machines are continuous and automatic, and receive all the sand and pyrites direct from the battery boxes or at the end of the copper and blanket tables, no additional hands being required to work them. In this process the action of gravitation is not depended upon to sink the particles of gold and silver to the bottom to be amalgamated. Currents of quicksilver are introduced instead, which seize upon the valuable metals and amalgamate with them. The machines are portable and inexpensive to erect. The small percentage of gold and silver that has escaped may afterwards be caught by the same firm's concentrator. Messrs. Watson & Denny's process and machines are highly spoken of by many mine managers who have them in operation.

Mr. Neill's patent concentrating and gold-saving pan claims to be the best machine for saving the finest float gold and silver from pyrites or from the tailings and tail water flumes of batteries, catching both after they had escaped the vigilance of all other gold-saving apparatus. The process is recommended by practical men who have made trial of it. Messrs. D. Munro & Co., and Langlands & Co., of Melbourne, and several others, have powerful machinery on view, which shows the latest improvements in winding, stamping, and amalgamating machinery. A complete working model of the Band of Hope and Albion Consols Company's (Ballarat) crushing plant is a very instructive exhibit. The mine where it is at work is among the few very extensive quartz mines of Victoria, and has been growing during the past five-and-twenty years by the acquisition of adjoining claims, and by pushing its search for paying stone further and further in the direction of the earth's center. This company has adopted one after another of the principal inventions for economical quartz getting and treatment, though it still lacks some of the more ingenious and bold of the American notions on the subject. The Band and Albion machines resemble those of the Port Phillip Company in their general features, and to see them at work, as shown in the Exhibition, is an excellent introduction to the study of the science and art of quartz treatment. The various minerals into which gold-bearing quartz can be resolved are shown each in its separate receptacle, and from one of these (oxide of iron, obtained from pyrites) the company manufactures excellent paint, by grinding it in combina-

tion with linseed oil. The paint forms a good protection against weather, is of a rich claret color, and has a fine appearance when ished and varnished for carriage and railway rolling-stock work. its color is very pronounced, difficult to kill, as the painters say, cannot be overlaid so as to conceal it.

But before treating quartz it is necessary to find it, and there many valuable appliances to this end in the Exhibition. The Aus lian water auger by Messrs. Wright & Edwards, of Melbourne, is a v useful boring apparatus, which has done valuable work in finding derground water in the arid plains of Central Australia, and does less excellent service in aiding in the search for gold and other miner The auger can pierce clay, sand, sandstone, sand-drift, limestone, c ent, decomposed timber, pipe-clay, slate and quartz bowlders, and sl and very hard quartz; and when driven by a steam engine it will plore at the rate of 3 or 4 feet in an hour. This auger is shown at wor the Exhibition. Diamond drills are also employed in the search gold and other minerals. A diamond drill is shown by Messrs. Pa & Lacy, representing the M. C. Bullock Manufacturing Company Chicago. It is adapted to both underground working, exploring prospecting. It is operated by means of compressed air, produced two engines of 8-inch cylinders and 8-inch stroke, set at right an to each other. The piston-rods of these little engines are extended the pin of a disk crank, which revolves a 2-inch shaft which gi rotary motion to the diamond drill by means of miter-wheels. beveled wheel is keyed on to the end of the 2-inch shaft and the ot to the shaft of the drill, which is hollow, and works feed-bits of 4 f feet long as required. The rate of speed of the feed is under comp control, and there is an indicator fitted to the machine which sh when a change of stratum has occurred, and dictates to the oper such adjustment of the feed-bits as the circumstances require. Rand Drill Company, of New York, display what is a prominent gr in the Exhibition. Their machines are actuated by an improved rect-acting air-compressor, worked by an engine with a 12-inch cylin The piston-rod, extended, connects with a steel cross-head, work within side guides. Steel connecting-rods drive a crank-shaft at back of the cylinder, which revolves in plummer blocks. Inside connecting rods and at each side of the crank-shaft a fly-wheel of 4 f in diameter is keyed into it. At the end of the extended piston-ro connects with the piston of the air-compressor, which is 12 inches diameter, and has a 16-inch stroke. The covers of the compressing c inder are fitted with four air-valves; water circulates around the co pressor when at work to keep it cool. The speed of the engine is strokes per minute with 25 pounds of steam, and at that speed it compress air to an effective pressure of 75 pounds, sufficient to dr four or five of the smaller drills at the rate of from 300 to 400 blows minute. These drills are of two sizes; the smaller one, called the "*Li*

Giant," being light, is capable of being worked by two men, and well suited to underground work in limited space, while the larger one, called the "Slogger," is suited for heavier operations where there is more room. It is claimed for the smaller drill that it will make a bore of 1½-inch diameter in basaltic rock at the rate of 7 inches per minute. The "Slogger," it is alleged, uses steam or air expansively, strikes an uncushioned blow, and is set with a late cut-off, thereby realizing the greatest drilling power possible. It is in evidence that this drill, working under inspection, drove a heading 9 by 17 feet, 102 feet in one week in hard quartzitic gneiss. In getting out the quartz all known explosive compounds have been tried with varying success. Blasting, pebble, and Nobel powder have been much used; also gun-cotton, nitro-glycerine, and dynamite, of which last named there is a manufactory near Melbourne; but recently a new explosive has come into use, and is shown here by the Rand Drill Company, under the name of Rackarock. It claims to be equally effective in wet as in dry holes, to be unaffected by climate, to emit no injurious fumes on combustion, and can be as easily stored and transported as ordinary merchandise. It is having a fair trial here.

MELBOURNE, *January* 8, 1889.

CHAPTER III.

REPORTS RELATING TO THE COLONIES.

SKETCH OF THE AUSTRALASIAN COLONIES.

By JAMES SMITH, Esq., *of Melbourne.*

Australasia is a comprehensive term which is geographically applied the whole of the Australian continent and the islands of Tasmania d New Zealand. These include a total area of 3,075,030 square les, which is one-sixth less than that of the United States. The gregate population of this group of colonies is, in round numbers, 00,000, being about the same as that of the State of Ohio.

The disproportion of population to territory is strikingly evidenced the fact that there is only one person and a fraction to every square e; and the remoteness of this part of the world from the teeming e of human beings in Europe, coupled with the length of the voyage l the relatively high cost of the transit, necessarily operates to the couragement of that rapid expansion of population which has taken ce in America. At the present rate of increase, population doubles lf in Australasia in forty-two years; and the government statisti- n of Victoria estimates that at the end of the next century it will ch upwards of 189,000,000. But any calculations of this kind are ble to be disturbed by considerations arising out of the geographical figuration of the Australian continent, which differs so essentially m that of North America. Down the center of this latter flows a gnificent river of enormous length, fed by many confluents scarcely erior in magnitude and volume, watering valleys sufficiently exten- e and sufficiently fertile to qualify them to become the granaries of rope. The center of Australia is comparatively waterless, and some- ng like one-third of the entire area of the continent is covered by desert sandstone, which may be traced from the western plains of eensland and New South Wales right across to Western Australia. rge tracts of country are as sterile as the deserts of Colorado, in- ted in places by salt lakes, or saline depressions, which seem to indi- e that at some very remote period the sea had flowed over them. Hence mense areas of the continent must remain for an incalculable period time uninhabited and uninhabitable; and population will continue to centrate itself upon a belt of land stretching inland for a distance 300 or 400 miles from the sea-coast, except on the shores of the great

Australian Bight, where for something like 500 miles there creeks or rivers discharging themselves into the ocean, and t toria desert which covers an area, roughly estimated at somethi 600 square miles.

GEOLOGICAL FORMATION.

Geologically speaking, Australia is one of the oldest countrie world. Its mountain ranges belong almost exclusively to the Pa formations, the upper Paleozoic or Carboniferous predominati the coast line of New South Wales and Queensland, where coa ures covering millions of acres are being profitably worked. T ondary formations are mostly to be met with in Queensland, wh cretaceous beds are believed to extend over an area of 200,000 miles. Tertiary deposits of the Pliocene age are distributed enormous area, and to these the desert sandstone, the coral lim the gravels, conglomerates, and clays of the auriferous regions In the Quaternary or post-Pliocene deposits are found the only r of the extinct Australian fauna, including those of a kangaroo as large as an elephant, and of a bird, named the dromorsis, much than an ostrich. Extinct volcanoes abound both in Victoria and Australia. Some of their craters are 2,000 feet above the level sea, and they are occasionally filled with water, so that you me lakes at the summit of considerable eminences.

I have dwelt upon the geological formation of the Australian nent because of the influence it may exercise upon the physical ter of that branch of the Anglo-Saxon race which is now eng planting a future nation there. It is the contention of some e scientists that there is a close parallelism between the perfectio soil of a given country and that of the animals and human bein are sustained upon it. The more recent the formation the bet soil, and the finer the development of the men and women w reared upon it.

INHABITANTS.

All the dominant races of the world, we are told, have inhab gions which belong to late geological formations; and M. Tremau "Origine et Transformations de l'Homme, et des Autres Êtres," this rule to be so absolute that not a single example is to be m of a civilization having been developed or even maintained in t of a people migrating to a country where the geological conditi unfavorable. If this be so, and if a large portion of the Australi tinent was formed at a very early epoch, so that it has not und those changes which would qualify it to become the abode of a claiming to stand in the vanguard of civilization, it follows tha degeneration of the Anglo-Saxon race may be looked for in thes nies. And that it is being modified is obvious to any careful

tentive observer. The typical Anglo-Australian—I speak of those who have been born on that continent—is taller and thinner than his progenitors, with a narrower chest, greater length of limb, a clearer complexion, and brighter eyes. He has perhaps greater powers of endurance under circumstances of strong excitement than his forefathers, but his powers of application and sustained effort are not so considerable. He is more impulsive and less stable; more impetuous and less tenacious of purpose. As a soldier he would probably display some brilliant qualities in a charge; but whether he would go on steadily "pegging away" under circumstances of discouragement and difficulty, as the British troops of the line are in the habit of doing when officered by men of courage and determination, is somewhat doubtful.

The finest specimens of the Australian women resemble their American rather than their English sisters. They have frequently an air of refinement, and are, as a general rule, tall, slight, and graceful. Perhaps there is as large a proportion of pretty faces to be met with in the principal cities as you will find in those of the United States. But their beauty is of an evanescent character, and does not last until the half-way house of life has been reached, and even passed, as it does in England. The teeth decay at an early age, and the complexion becomes desiccated owing to the heat and aridity of the atmosphere during the summer months. But in the islands of Tasmania and New Zealand, where the climatic and geological conditions are different, there seems to be a reasonable probability that the physical and mental characteristics of the children and remote descendants of British settlers will not materially differ from those of the original stock in the United Kingdom.

Reverting, however, to the continent of Australia, it may be reasonably assumed that only the southern half of it, or that portion which lies below the twenty-fifth parallel of south latitude, will ever be thickly populated; and from that area must be subtracted some immense plains stretching from the river Murray to the river Darling, in the western districts of New South Wales, and the great Victorian desert, which intervenes between South and Western Australia. The tropical regions of Queensland, which runs up to within ten degrees of the equator, the northern territory of South Australia, which reaches a similar line on the map, and the northwestern districts of Western Australia can never be profitably cultivated except by Asiatic or Polynesian labor.

GENERAL RESOURCES.

As regards the interior of this extensive continent, nature seems to have decreed its unfitness for the prosecution of any other than pastoral and mining industries for a century to come, unless, indeed, science should devise some means of counteracting the disadvantages under which immense tracts of country now lie. These may be summed up in a few words: the absence of navigable rivers; the liability to severe,

and protracted droughts, during which running streams, shallow lakes, and water-holes are liable to dry up and disappear; great difficulties of internal communication; and a climate which is capricious in the extreme. For three or four years in succession, perhaps, an area of pastoral country, tens of thousand of square miles in extent, will enjoy fairly good or favorable seasons; and the lessees, or "squatters," as they are called, will increase their flocks until the land is fully stocked; and so long as grass is plentiful and the rain-fall, which is usually stored in dams or other reservoirs, is adequate, all is well. But suddenly the fountains of heaven appear to have been sealed up. Day after day, week after week, and mohth after month, the sky resembles a dome of burnished silver. No clouds fleck its dazzling surface by day; no dews refresh the parched earth by night. The natural herbage withers and becomes so dry that it crackles like fine glass under the feet. The soil in which it is rooted is transformed into dust, and when a fierce, hot wind rises in the north, it blows away not merely the surface soil, but the very roots themselves. If circumstances will permit of it, the squatter shears his flock, which may consist of fifty thousand or one hundred thousand sheep—for the fleece is all he can save—and the animals are then slaughtered and their carcasses are burnt. By this means they are spared the horrors of starvation, a few breeding ewes and rams being preserved and perhaps moved miles away to some spot in which there is a possibility of keeping them alive until the drought breaks up.

Such being the nature of the country in many parts of the interior, and such being the dangers to which its pastoral occupants are exposed, it is very evident that agricultural settlement and the formation of communities are impossible in those regions, under existing conditions. These, however, are not altogether intractable; for the success that has attended the boring of artesian wells in districts destitute of water-courses, and liable to drought, points to the possibility of combating and overcoming, to some extent, at least, the natural disadvantages under which those districts now labor. The flow of water from wells of this kind is usually voluminous and unintermittent, and there is every reason to believe that it arises from subterranean rivers which flow southward to the sea. An immense depression exists in the center of the continent, where the soil is porous, and the rains are tropical in violence and volume, forming lakes which explorers have noted down as apparently permanent sheets of water, but on returning to them a week or two later have found nothing but a dry bed full of cracks and fissures. Such, it is conjectured, are some at least of the sources of these subterranean rivers, which reveal their existence in the limestone caves of New South Wales and Victoria. Again, thanks to Messrs. Chaffey Brothers, formerly of California, about half a million acres of land in Victoria and South Australia, hitherto covered with an indigenous tree locally known as the "Mallee scrub," and useless for agricul-

ural purposes, will be transformed into orchards and fruit gardens by means of artificial irrigation from the river Murray; and the example thus set is likely to be followed in other parts of Australia, wherever a permanent stream of water offers the necessary facilities for the work. I would also mention another instance of American influence beneficially exercised. Twenty-four years ago the writer, one of the earliest of the Melbourne journalists, was so much struck by the powerful array of facts and arguments brought forward by the late George P. Marsh, in his "Man and Nature," for the purpose of establishing the intimate relations between the forests of a country and its annual rain-fall, that he urged upon the government of Victoria in the leading columns of the "Argus," the preservation of all such forests on the mountain ranges which constitute the gathering-grounds of the various rivers. This advice was acted upon; and in the adjoining colony of South Australia a public department of woods and forests has been created, which is raising one million trees per annum, and effecting plantations at the rate of half a million yearly. These are not merely a source of revenue to the state, but it is confidently anticipated that in a few years the multiplication of forests upon elevated tracts of country will be followed by sensible modifications of the climate, and will lead both to an increased evaporation and precipitation, in accordance with the well-established fact so strongly insisted upon by the late George P. Marsh, namely, "that within their own limits, and near their own borders, forests maintain a more uniform degree of humidity in the atmosphere than is observed in cleared grounds; that they tend to promote the frequency of showers, and, if they do not augment the amount of precipitation, they probably equalize its distribution through the different seasons."

The resources of the Australian continent naturally fall into three divisions—agricultural, pastoral, and mineral. Taking them in the order in which I have placed them, it will be necessary to remark that the three colonies which contain the bulk of the population lie within the same isothermal lines as Spain, Italy, France, Greece, Asia Minor, and the Southern and Southwestern States, excluding Florida. Hence the whole of the products grown in those countries can be, and, for the most part are, cultivated in New South Wales, Victoria, South Australia, and the more southerly portion of Western Australia.

AGRICULTURAL RESOURCES.

All the cereals and all the fruits which flourish in regions enjoying a mean annual temperature ranging from 59° to 70° attain a similar perfection in the temperate zone of Australia. Fully one-half the continent lies within a sub tropical zone, while all above the twenty-second parallel of south latitude possesses a tropical climate. Both in Victoria and in South Australia the annual production of wheat leaves a relatively large margin for exportation, although the totals appear insignificant by comparison with the immense movements of grain and flour

across the Atlantic from American ports to those of Europe. Wine growing is also becoming an important branch of industry; and there are twenty-three thousand acres under cultivation for this purpose in New South Wales, Victoria, and South Australia. The red wines approximate pretty closely to the hermitages, clarets, ports, and burgundies of Europe, and the white wines to the hocks, the sauternes, chablis, and madeiras of the Old World. Oranges, olives, currants and raisins, prunes, and dried figs may be enumerated among the special products of South Australia. The banana, the pine-apple, and all tropical fruits grow luxuriantly in Queensland, where, also, there are extensive sugar plantations. But the system of farming in all the colonies is such as, with some exceptions, tends towards the rapid exhaustion of the soil. To get as much out of the ground, and to return as little to it as possible, seems to be the chief aim of the agricultural population, who generally commence their farming labors with an inadequate capital, and with little or no practical knowledge or experience; and that which they do possess has been acquired in a country where the conditions of soil and climate differ entirely from those of Australia. Labor is excessively dear and insubordinate; there are the risks of drought and of bush-fires to be encountered; and when the corn-grower has reaped his crop of wheat, averaging 12 bushels to the acre, he must dispose of his surplus in markets where he is exposed to competition with that which is so cheaply produced in India and Russia, while the value of his grain in the local market is determined to a considerable extent by the price of wheat in Europe. Dairy farming is profitably pursued in those districts of New South Wales, Victoria, and South Australia where the annual rain-fall is sufficiently abundant to secure good pasturage all the year round; and the quality of the butter and cheese produced is excellent. The area of land under cultivation on the continent is 6,500,000 acres, or rather less than three acres per head of the population. In New Zealand and Tasmania there are nearly 2,000,000 of acres under cultivation, and the proportion to population is about the same as on the mainland. The land laws of all the colonies have been framed so as to offer every reasonable inducement to settle upon the land, by selling it at a nominal price and giving extended credit to the "free selector," while the system of legal transfer, encumbrance, and release is probably one of the simplest, most expeditious, and least expensive in the world. But in Australia, as elsewhere, the tendency of population to aggregate itself in a few large centers is very marked. Melbourne and its suburbs contain more than one-third of the inhabitants of Victoria; Sydney has attracted to herself an equally large proportion of the population of New South Wales, and the same congestion of the brain, if I may so express it, is noticeable in Queensland, South Australia, and Tasmania, if not in New Zealand. In Victoria it has been stimulated by the fiscal policy of the country, which has been directed to foster manufactures, and thus offer special inducements for the with-*drawal of capital* and labor from the country districts.

PASTORAL RESOURCES.

For reasons previously stated, immense areas of the thinly-peopled continent are devoted to pastoral purposes exclusively, the various governments leasing blocks of country, covering in some instances 10,000 square miles, to squatters, who pay an annual rent for their "runs" or "stations," which is generally determined by the number of sheep and cattle they are capable of supporting. In Queensland, for example, 295,265,280 acres are held under lease or license by pastoral tenants, in addition to a large proportion of the alienated or "conditionally purchased" land. In New South Wales 142,927,360 acres are similarly held, and in South Australia 291,464,960 acres. I have not the return of Western Australia, but as its area is 975,920 square miles, which is equal to that of New South Wales and Queensland put together, and as it has only 135 square miles under cultivation, it follows that nearly the whole of its enormous territory, which is equal to more than one-fourth of that of Europe, must be available for, if not actually dedicated to, pastoral occupation. Hence the magnitude of the following figures for 1887 showing the live-stock on the continent will occasion no surprise:

Sheep	68,000,000
Cattle	7,500,000
Horses	1,150,000

But to these must be added on account of New Zealand and Tasmania the following:

Sheep	18,300,000
Cattle	1,150,000
Horses	200,000

which makes a total of 86,300,000 sheep, 8,650,000 head of cattle, and 1,350,000 head of horses, owned by three millions and a half of people. The aggregate production of wool in Australia, Tasmania, and New Zealand may be taken as averaging 410,000,000 of pounds, the valuation of which will range from $85,000,000 to $100,000,000, according to the state of the market.

MINERAL RESOURCES.

The minera. resources of the Australian continent may be spoken of without exaggeration as enormous. They include nearly all the precious stones known to commerce, the royal metals, copper, tin, antimony, lead, manganese, asbestos, shale, bismuth, quicksilver, iron, coal, and an abundance of the finest kaolin and of the coarser clays employed by the potter, as well as marble, granite, slate, freestone, basalt or bluestone, and other building materials.

As a portion only of the settled regions of Australia has been geologically surveyed, it is impossible to furnish even an approximate estimate of the auriferous area of the country. In Victoria alone it has been ascertained to cover 20,000 square miles, and the value of the gold

raised up to the end of the year 1886 in that colony exceeded one thousand million dollars. In New South Wales the total product of that metal has been $180,000,000, and in Queensland $100,000,000. Gold mining is also being pursued with satisfactory results in both South and Western Australia as well as in the island of Tasmania. New Zealand is likewise rich in gold deposits, and its gold production to date reaches $27,000,000 in value. About five years ago a silver mine (Broken Hill) was discovered in New South Wales of such richness as to resemble the celebrated Comstock lode. The yearly dividends exceed the amount originally paid for each share (£19), and the latter is now worth some thing like £300 on the stock exchanges of Sydney, Melbourne, and Adelaide.

Between 3,000,000 and 4,000,000 ounces of silver are annually taken out of the mines in New South Wales, while the cupriferous deposits in that colony cover an area of 6,713 square miles. But South Australia has been the largest producer of this metal until its low price checked or suspended operations, the total yield up to the end of the year 1887 having been of the value of $100,000,000. Copper mines have also been worked in Queensland and Victoria. New South Wales, Tasmania, and Queensland are the chief producers of tin, the annual value of the stanniferous products of these colonies reaching a total of $5,000,000.

The largest coal measures on the Australian continent appear to be confined to the eastern portion of it, comprehending the colonies of New South Wales and Queensland. These measures follow the coast-line from the twenty-fourth to the thirty-sixth parallel of south latitude, ramifying many miles inland. Their estimated area is 50,000 square miles; and some of the deepest seams have been found in the immediate neighborhood of excellent ports and harbors, thus facilitating the export of this mineral. There are also extensive coal deposits of a very superior quality on the west coast of New Zealand, where, as at Westport, it is hewn out of the mountain side and sent down to the ship by natural gravitation. In Tasmania, likewise, there are coal fields which are being profitably worked for local consumption. Kerosene shale is chiefly found in New South Wales, but the annual production does not at the present time exceed half a million dollars in value. Iron ore yielding 22 per cent., and brown hematite affording 50 per cent. of metallic iron are met with in abundance in New South Wales with the usual concomitants of limestone and coal. The chief iron works are in the neighborhood of a place called Lithgow.

TARIFF.

In speaking of the economic wealth and progress of the Australasian colonies it is almost impossible to avoid making mention of a curious anomaly which strikes an American visitor more particularly. Each colony has its own tariff, and no two tariffs are alike, so that produce *and merchandise* passing from one province to another pay customs

duties on crossing the border. We have only to imagine the State of New Jersey taxing almost every article possessing any commercial value that crosses the Hudson from New York, and *vice versa*, in order to comprehend the manifest inconveniences and mischievous absurdities of such a fiscal system, and the evils which the Australian, or rather the Australasian colonies endure, owing to the absence of any bond of union such as that which binds the United States into one confederate whole, and establishes absolute freedom of interchange throughout the length and breadth of its vast territory. For in Australasia, each of the seven colonies of which it is composed occupies a position precisely analogous to that of the different States. Each has its own legislature, composed of two chambers; its own governor (only appointed by the Crown instead of being elected); and its own statute-book. But the Imperial Government, when conferring constitutions upon these colonies, omitted to make any provision for the adoption of a common tariff; and hence certain of them have adopted a policy of protection, not merely as against foreigners and their own countrymen in Great Britain, but as against their neighbors, from whom they may be separated only by a stream, or by an imaginary geographical line of demarkation. Thus, if John Jones drives across this line in order to visit his brother Thomas, living on the other side of it, and takes the latter half a dozen of home-grown wine, a pair of fowls, a sack of potatoes, and a bag of flour, he will have to pay duty, not only upon each of these articles, but upon the cart, horse, and harness used in their conveyance; and if he takes a kilderkin of ale, a box of cigars, and a case of fruit back again, he will find these taxed by a border custom-house officer belonging to his own colony. Such a statement may appear incredible, but it is nevertheless substantially true.

There are two conterminous colonies which have adopted diametrically opposite fiscal systems. New South Wales adheres to the policy of free trade, while Victoria has adopted that of protection, ever since the year 1865. And the former colony claims that it has been enabled by the course it has adopted to outstrip its neighbor and competitor. It points to the fact that whereas ten or twelve years ago Victoria contained 250,000 more people than New South Wales, the population of the latter now exceeds that of the former; and that as regards shipping, commerce, manufactories, revenue, and general prosperity, New South Wales is ahead of Victoria. It is no part of my duty to enter into the much-vexed question at issue between the two colonies; but the following passage from a speech delivered by Sir Henry Parkes, the premier of New South Wales, throws so much light upon the economic condition of the two communities which stand at the head of the Australasian section of the British Empire, that I can not forbear quoting it:

In 1887 the imports into New South Wales amounted to £18,806,236, while the imports into Victoria amounted to £19,022,151. In the same year the exports from New South Wales amounted to £18,496,217, and from Victoria £11,351,145; while the value of the trade of New South Wales amounted to £36 9s. 8d. per head of the population,

and the united trade of Victoria amounted to £29 15*s.* 10*d.* per head, so that we were far ahead of our sister. If we looked at the shipping (and he supposed even in these modern days the tonnage of the sea-going ships was a fair criterion of a nation's prosperity), last year the shipping of New South Wales—the vessels entering inwards and going outwards—amounted to 4,322,758 tons; the shipping of Victoria amounted to 3,858,243 tons; so that in this great element of national prosperity we were far ahead of our sister. If we looked to the public revenue from all sources, the revenue of New South Wales last year amounted to £8,582,811, while the revenue of Victoria amounted to £7,054,434. (But there was a criterion which went far beyond these figures, which he thought the most indisputable—the most certain of all criteria—namely, the nation's comfort.) He was one of those—he had said it often, and he would say it often again, if he lived—he was one of those who would count civilization itself a failure if it did not improve the condition of the great mass of his fellow-creatures. He did not count the amassing of fortunes by a few against the unimproved level condition of a hand-to-mouth existence on the part of the many; but he counted the nation's happiness to consist in the diffusion of its wealth over the greatest number of family homes; and in that respect he thought it could be easily proved that this colony of New South Wales did not stand at the head of the other colonies, but stood at the head of the civilized world in a condition of happiness. It was impossible for him in a discussion of this kind to advert to all nations of the world, but he would take five—Germany, France, the United States of America, the United Kingdom, and the colony of New South Wales. The wealth of the population of Germany averaged, to the whole population, was about £18 per head—what he meant was taking the largest fortunes and the moderate fortunes, and the position of men who live from hand to mouth and the position of persons who had nothing at all—taking the wealth of all, and dividing equally amongst the inhabitants. In Germany the average wealth of the population was 18.7; in France, 25.7; in the United States, 27.2; in the United Kingdom, 30.0; and in New South Wales, 52.0—or, in other words, the wealth of New South Wales, distributed among all the inhabitants, would be nearly three times that of Germany, more than double that of France, nearly double that of the United States, and considerably more than that of the United Kingdom. In other words, this colony at present, tried by this test—he knew of no better—was better off than any other country in the world.

These figures have an obviously important bearing upon the subject I am now approaching, namely, the consuming power of the population, as regards its capacity for becoming a customer for American produce and manufactures.

CONSUMPTION.

There can be no question that there is no part of the globe in which, owing to the generally high wages which prevail, and the extreme cheapness of the necessaries of life, combined with the fact that owing to the mildness of the winters, the outlay for fuel, blankets, and clothing is inconsiderable, there is so wide a margin between the earnings and the unavoidable expenditure of the great mass of the people; that margin representing the amount available either for saving, or for disbursement upon comforts and luxuries. Skilled labor is remunerated at the rate of $2.50 to $3 per diem, and unskilled labor at from $1.50 to $2, the day consisting of eight hours only. Now, as a single man can obtain board and lodging for 2 shillings (50 cents) a day, which includes meat at each of three meals, it follows that his position is an exceptionally favorable one, qualifying him to become a large consumer of the products *of other nations*. Taking the mean of eleven years, the total

value per head of the imports for the different Australasian colonies is as follows:

	£	s.	d.
New South Wales	23	7	3
South Australia	20	8	1
Victoria	19	11	2
Queensland	19	6	10
New Zealand	16	14	6
Western Australia	14	16	3
Tasmania	12	9	5

The total annual value of the imports into the whole of these colonies, striking the same average, is £53,589,477; and of this large amount of business, three-fifths are transacted with the mother country; while the present trade with the United States is less than 5 per cent. of the whole sum, thus showing how large and profitable a field of commercial enterprise awaits exploration by Americans, who certainly understand the wants and requirements of new countries better than the more conservative merchants and manufacturers of Great Britain, habituated to the routine methods of old civilizations and long-settled communities. American labor-saving machinery, the many ingenious mechanical appliances, the invention of which has been forced upon them by the exigencies of their social organization, aided by the ingenuity of their people, ought to find an ever-expanding market in the Australian colonies, where, indeed, American organs and pianos, American sewing-machines, American clocks and watches, kerosene, hardware, tinned fish, canned fruits, and "Yankee notions," have found a considerable outlet for many years past. And should a more active demand arise in the United States for Australian wools, the finer staples of which are in request for the fabrication of the choicer kinds of broadcloth, blankets, and flannels, in every country in Europe, and direct shipments take place from Australia to American ports, it may be reasonably expected that these shipments will be paid for by return freights provided by American shippers with their produce and manufactures. It is true that a population of three millions and a half does not, at first sight, constitute a very important market, but then, as I have already shown, the consuming power of each unit of that population is very great indeed, as will be seen by the following figures, showing the value of the net imports of the under-mentioned countries, in shillings per head of the population, as given in Mulhall's Dictionary of Statistics, published in 1884:

	Shillings.
Australia	420
Holland	375
Belgium	246
United Kingdom	196
South Africa	166
Canada	110
France	104

MELBOURNE, *January* 7, 1889.

REPORT ON COMMERCIAL RELATIONS.

By Assistant Commissioner F. B. WHEELER.

MELBOURNE, *January* 16, 1889.

In reviewing the rapid growth and progress of the trade and commerce of these colonies with the world generally, and more especially th Great Britain, the mother country, and with the United States (in ıich we are more particularly interested) it will be useful to take a ief survey of the conditions under which the colonies were first set- d and of their gradual development from a penal settlement up to e time of their present importance as one of the chief purchasers of the ınufactures of the former country and the principal source from ence her wool, tallow, grain, gold, silver, and other metals are de- ed.

NEW SOUTH WALES.

Taking, therefore, a cursory glance at the early history of its settlement, we have, to begin with, what is now the important and prosous colony of New South Wales, which, at the time we are now rering to, comprised the present separate colonies of Victoria and eensland, in addition to her present territory, the latter alone being extent of square mileage considerably her superior.

n 1786 the British Government, represented by Viscount Sydney, then Secretary of State for Foreign Affairs, first resolved upon the onization of the country in consequence of the favorable report made Capt. James Cook, who had been some time previously sent out on oyage of discovery in the vessel *Endeavour* and a small accompany- fleet. This report dwelt in laudatory terms on the general capac- of the country for settlement, and in a short space of time after- rds Captain Phillip was dispatched with eleven vessels containing ıvicts and stores. On January 26, 1788, he first landed at Botany y, so called in consequence of the vast number and profusion of r and unknown varieties of plants which grew along the shores. is name afterwards became so intimately associated with crimi- ls and convicts as to become a term of reproach. Captain Phillip

took out with him about one thousand and thirty persons as settlers, most of whom were convicts; and considerable suffering was at first experienced on account of the ill success of their attempts to raise grain for their support, the soil proving to be quite unfit to repay the labor expended on its tillage. For awhile all hands had to go on short allowance (including Governor Phillip himself) who took share and share alike with his people; even the live-stock brought with them for breeding purposes had to be used for food. However, before the community had been brought to very dire straits, relief came in the shape of another expedition from England with supplies. It was not long after this that fine arable land was found along the Hawkesbury River, which, being carefully tilled, effectually removed all apprehensions as to short supplies of food, by producing heavy and regular crops of wheat and other grains. It is interesting to note that this very land, which ninety years ago was almost without value, now commands a price equal to $2,000 per acre for purely agricultural purposes, and is considered equal, if not superior, to any farming land in the world.

The settlement thus formed by Governor Phillip was after all not located at Botany Bay, where Captain Cook touched, but a few miles lower down on the coast where an opening from the ocean, apparently overlooked by Cook, led into the magnificent harbor of Port Jackson. The settlement was named "Sydney" in honor of the minister of the Crown who had been instrumental in sending out the expedition of discovery.

Sydney is now a beautiful city of 350,000 inhabitants, possessed of some very fine buildings and containing most of the modern improvements and inventions. In building up the town, however, no fixed plan appeared to have been followed out, but just where the old bullock tracks meandered, alongside were the houses erected; thus not only are the older settled and more important streets comparatively small and narrow, but they curve and wind in all directions.

This settlement continued to prosper and increase, aided by fresh arrivals from the old country which came, from time to time, to swell their numbers. Unfortunately, the great majority of these immigrants were convicts, expatriated from England for all sorts of offenses, from forgery down to such petty infractions of the law as would in these days, and under the more humane code which now prevails, entail scarcely any penalty worth speaking of. The moral degradation, the association with hardened criminals, and the severe regulations and penal discipline, scarcely recognizing any difference in the degrees of guilt, and treating with equal severity the vicious and the beginner in wrong-doing, deemed necessary in those days to mark the nation's resentment towards offenders against her laws, served to harden those whom milder treatment and reformatory measures only might have converted into good citizens. As it was, however, the more desperate characters appeared to grow worse, and it was not long ere the com-

munity became almost ungovernable. On several occasions outbreaks and mutinies occurred; fearful crimes were committed by prisoners who had escaped from the chain-gangs where they were employed in road-making and other public improvements; drunkenness prevailed to an alarming extent, and it was only by the firmness displayed by those in command at the time that any kind of law and order was maintained.

The general method pursued in the treatment of the convicts was to place the better class out as servants and laborers among those free settlers and officials in need of such, and these became known under the name of "assigned" servants. In many instances severe burdens and hardships were inflicted upon them, there being but little remedy procurable by making complaints. The convicts sentenced for more serious crimes were as a rule employed in chain-gangs in the work of road-making, harbor improvements, and on public buildings.

From its first settlement until the year 1840 these offscourings of the parent country continued to arrive; but public feeling, which for a long time previously had strongly protested against these importations, had its due effect at home, and these expatriations were finally discontinued. In 1846, however, it was proposed to renew their introduction, but the prevailing sentiment against it was so strong that the idea was finally abandoned. There is much that is interesting to the general student of human nature in the history of these times and of the treatment of the convicts, which appears frequently to have been extremely harsh and cruel, and calculated to arouse and strengthen every bad passion, instead of adopting more humane methods, and thus endeavoring to reform them. For the information of those desirous of learning something further about these matters—and no doubt it is a subject of deep interest to every humanitarian—reference can be made to a small work lately published at Sydney entitled, "The History of Botany Bay." There can be little doubt but that something of the general effect of the treatment then considered necessary to pursue towards the New South Wales convicts, and its generally lowering tendency, may yet be seen amongst the more ignorant and debased class of the population which is locally known as the "larrikin" class, though in this connection it is but just to say that the marvel is how, from such an origin, so fine a people should have sprung. It must not, however, be inferred from the foregoing that the majority of the people now forming the population of New South Wales are descended from the old-time convicts. Many free settlers came out, whose numbers constantly increased with the growth of the country and the opportunities afforded them of land grants and the like. Nevertheless, it is a fact that a sufficient infusion of the lawless and criminal element yet remains.

As New South Wales was for a long period the only portion of the continent settled, and as it still remains, in many respects, the most important of the group of colonies, it has been thought desirable to dwell at some length upon her history, giving a glance also at the state of the whole

country and some of the more important events as rehearsed below under their several dates.

1787. The first harvest was gathered at Rose Hill (Parramatta).
1793. The government bought from the settlers the first sale of wheat, viz, 1,200 bushels.
1796. Coal was discovered at Port Stephen.
1796–'98. Remarkable explorations of the coast took place by Bass and Flinders.
1800. Extraordinary rises in the value of property culminated in such prices as £90 for a horse, £80 for a cow, £7 10*s.* for a Cape sheep, £1 for a goose, 16*s.* a pound for tea, etc. These rates were the result of a combination of traders, composed of the official and military classes, who obtained control of the merchandise arriving and of the agricultural products.
1803. The first Australian newspaper was started by Mr. George Howes, the "Sydney Gazette and New South Wales Advertiser."
1804. Trouble arose among the convicts and many were hanged.
1806. A memorable flood occurred at the Hawkesbury. Many persons perished and many families were ruined. Food of all kinds rose rapidly in price and caused little short of a famine. Very inferior bread sold at 54 cents a pound.
1813. The first successful attempt was made to cross the Blue Mountains.
1817. The Bank of New South Wales was established.
1819. The population of Sydney was about 7,000, or one-third of the whole colony.
1824. Witnessed the first installation of self-government by the institution of a legislative council and the formal acknowledgment of the liberty of the press. The first chief justice, attorney-general, and colonial treasurer of the colony arrived in Sydney. The "Australian" newspaper was first published, and the first exploring expedition toward the south (Port Phillip, now the harbor of Melbourne) was successfully undertaken.
1825. Nearly thirty vessels were engaged in the whaling industry alone, and many others in the seal and pearl fisheries, all being owned by Sydney merchants.
1826–'28. Witnessed a continued drought, which caused a financial panic. The success which had previously attended pastoral pursuits had caused a rush for investment in live-stock and land. Ruin and distress fell upon hundreds of people who shortly before had been reputed wealthy.
1828–'29. The free male adult immigrants to Sydney did not exceed two hundred and fifty in each of these years.
1830. This number fell to one hundred and sixty-six. The number of convicts, however, introduced during these three years was three thousand, five-sixths of whom were men.
1831. Steam navigation was introduced. The *Sophia*, of 154 tons register, was brought out from England. Two small colonial-built steamers were also launched. The system of free grants of land to private individuals was stopped by order of the Imperial Government, by which all lands were in future to be disposed of at public auction.
1833. The right of emancipists (convicts whose terms had expired or been canceled) to sit as jurors was legally settled in their favor.
1835. The agitation in favor of representative government greatly increased.
1836. Religious equality permanently established by law.
1837. Of a population of 76,000, 55,000 were free and 21,000 convicts.
1840. Transportation of convicts to New South Wales ceased.
1840. The colony was divided into three districts—the Northern, now Queensland; the Middle, now New South Wales; the Southern, now Victoria. Seventeen vessels, carrying 1,196 tons, were built and registered during the year.
1841. New Zealand was proclaimed by Governor Gipps a separate government. A general census was also completed, showing 87,298 males and 43,558 females in the colonies, including the new settlement of Port Phillip.
1842. The city of Sydney was incorporated. Tobacco first manufactured.

). The right of representation was conceded to the colonists and a council of thirty-six members established, twenty-four to be elected by the people, six to be government officers, and six Crown nominees. The Bank of Australia failed, and a report of the council showed thirteen hundred mechanics and laborers out of employment in Sydney alone. In this year the value of exports for the first time exceeded that of the imports.

5. The Great Southern and Western Railway Company was formed to construct railroads from Sydney to Goulburn, to the Hawkesbury, and to the Nepean.

7. The new regulations were received in the colonies, according to which the public lands were divided into three classes, viz, the settled, intermediate, and unsettled. The settled comprised the nineteen original counties, together with those of East and West Macquarie; all lands within 25 miles of Melbourne, 15 of Geelong, and 10 of several other towns; all within 3 miles of the sea and 2 miles of the Glenelg, Clarence, and Richmond Rivers. The intermediate comprised, except what is included above, the counties of Bourke, Normanby, Grant, and Auckland, the district of Gippsland, and any counties which might be fixed and proclaimed before December 31, 1848. The unsettled comprised the remainder of New South Wales. Leases were to be given not exceeding fourteen years for pastoral purposes in the unsettled districts and for eight years in the intermediate, and one year in the settled, subject to certain provisions in every case.

. The *Harkaway*, with two hundred and twelve male convicts, arrived at Sydney, causing an immense hostile demonstration and a protest requesting her immediate return to England. The governor being opposed to this request, a petition to the Queen was adopted praying that Earl Grey, secretary of state for the colonies, should be removed and that the government of the colony might be carried on by ministers chosen from among themselves.

The home Government informed the colonists that no more convicts after those already on the way would be sent to any part of New South Wales. In this year Port Phillip, now named Victoria, was granted colonial independence.

The first representative legislature of New South Wales came to a termination after an existence of eight years. In December of this year an event occurred which was destined to completely revolutionize the interests and relations of the colony. A Mr. Hargraves discovered gold in the neighborhood of Bathurst, about 140 miles west of Sydney. The consequent rush to the gold regions and excitement of the people affected the price of provisions, and in two weeks flour rose from $100 to $150 per ton. In June the first gold, valued at £3,500, was sent home to England. The census this year showed 184,550 free and 2,693 bond.

The first mail steamer, the *Chusan*, arrived from England via the Cape, having made the voyage in seventy-nine days under contract between the home Government and the Peninsular and Oriental Steamship Company for bi-monthly communication.

. The council voted £10,000 to Hargraves as a reward for his having discovered gold. The sum of £200,000 was also appropriated for the purpose of assisting a desirable class of immigration.

5. Steam communication with England ceased owing to that country being engaged in war with Russia. The new constitution providing for a complete system of responsible Government, which had been sent home for sanction, was returned to the colony confirmed. This year the council increased the governor's salary from £5,000 to £7,000 a year. The railway to Parramatta, 14 miles from Sydney, was opened.

56. Opened with the establishment of responsible government. The population of Sydney and suburbs showed 81,327.

57. Witnessed extensive floods at the Hunter, the Hawkesbury, and other parts.

1858. Vote by ballot became law. The assembly or lower house was increased to eighty members and the franchise given to all adult males of six months' residence in any electoral district. Communication by telegraph was established between Sydney, Melbourne, and Adelaide.

1859. The Darling River was ascended by Captain Cadell, in a steamer, for 500 miles, and telegraphic communication with Van Diemen's Land completed.

1860. Witnessed disastrous floods throughout the colony, causing heavy losses in stocks and crops. As a set-off, however, the Snowy River gold field was discovered.

1861. A rush took place to a new gold field at Lambing Flat, and shortly after collisions occurred between the miners and the Chinese. The volunteer movement was inaugurated.

1862. The Chinese restriction act came into force, imposing a poll-tax of £10 on every immigrant of that nationality.

1864. Disastrous floods visited the northern districts, causing the loss of several lives and ruining the crops.

1865. During this and the previous year bush-ranging was carried on to an alarming extent, in spite of the death punishment meted out to many of the leading desperadoes.

1866. Sydney sovereigns were proclaimed legal tender by the Imperial Government. Terrific gales and heavy shipwrecks visited the coast, causing much loss of life.

1867. Was marked by the occurrence of most disastrous floods and great loss of life.

1869. An intercolonial exhibition was held at Prince Alfred Park. Terrible floods again occurred this year, resulting in heavy loss.

1871. Thirty thousand pounds was voted towards works of defense.

1872. The first telegrams were sent from Sydney across the Australian continent for transmission to England. The Great Western Railway to Macquarie Plains was opened.

1873. Tremendously heavy rains visited Sydney and district, flooding the lower portion of the city. The office of solicitor-general was abolished, and a department of justice and public instruction was created with a minister at its head.

1875. The *Vasco di Gama* arrived at Sydney, being the first temporary vessel of the new Pacific Mail service.

1876. The English mails were for the first time delivered overland from Melbourne to Sydney, the time occupied being forty-two hours. A continuous ten months drought broke up with rain-fall.

1878. Was notable for the public agitation against employing Chinese, and for the opening of the public museum and free library on Sundays.

1879. Saw the inauguration of the system of steam traction in place of horse for the street tramways of Sydney.

1881. Was census year and showed a total of 751,468 for the colony, of which 411,149 were males and 340,319 females. Small-pox made its appearance in Sydney alarmingly, and notwithstanding that the most stringent regulations were imposed, it was not until the following year that the city could be declared free. The Chinese restriction bill was also passed in December.

1882. New South Wales was presented by the Queen with a vessel of war, the *Wolverene*, and thus commenced to have a navy of her own.

1883. The Sydney Corn Exchange was inaugurated. Numerous discoveries of precious stones and mineral stook place, notably the wonderful silver mines at Broken Hill and Silverton, the yields assaying the fabulous amount of 6,000 to 20,000 ounces of silver to the ton.

1884. An electoral census showed 214,016 names of adults entitled to the franchise. A universal depression threw thousands out of employment, and public clamor succeeded in reducing the vote for assistance to immigration from £75,000 to *£50,000.* The colonial treasurer proposed the startling sum of £14,668,808

as an estimate for a series of loans to the colony, of which over £13,000,000 were for new railway lines and branches. This was, however, shelved for a time. Statistics generally showed the colony, notwithstanding the serious depression extant, to have steadily progressed.

The first Australian cardinal, Archbishop Moran, was appointed. Several expeditions were dispatched to explore and open up New Guinea to Australian enterprise.

Showed increasing activity in mining operations throughout the colony. Considerable uneasiness in business circles was caused by the treasurer's announcement in October that the deficit, in connection with the revenue, had increased to over £2,000,000 sterling, leading in 1887 to the resignation of the premier, Sir Patrick Jennings, whose administration had favored a protective policy, and had even carried a measure looking in this direction. The country at large was appealed to and the result was to reverse this policy in favor of free trade. As the year drew to a close one of the principal subjects of interest was the near approach of the centenary of Australian colonization and the various preparations for its proper celebration, especially for the forthcoming International Exhibition to be held at Melbourne.

. Extensive official and popular rejoicings occurred in the early portion of the year, in commemoration of the one hundredth anniversary of the settlement of Australia, in that portion known as New South Wales. These were on a large scale, and for the time being occasioned the entire cessation of business, everything and everybody yielding to the occasion. The population in 1888 is figured at 1,057,000 persons.

ubjoined are comparative tables showing the increase of population m time to time from 1816; also some figures relating to imports, ex-ts, the revenue and expenditures, etc.

iparative tables showing increase of population and trade in the colony of New South Wales.

Year.	Total population.	Acres.		Revenue.	Expenditure.	Imports.	Exports.
		Tilled.	Pastoral.				
.....	9,200	12,860	48,855	.....	.....	.....	.....
.....	.....	.....	.....	.....	£235,000	.....	.....
.....	.....	.....	.....	.....	231,000	.....	.....
.....	.....	.....	.....	.....	150,000	.....	.....
*	32,778	32,267	.....	.....	.....	.....	.....
.....	33,675	45,514	.....	£71,682	82,000	£300,000	£100,000
.....	51,155	.....	.....	121,066	103,228	490,152	324,168
.....	76,000	.....	.....	.....	.....	1,580,805	882,000
.....	.....	.....	.....	682,473	561,023	3,014,189	1,399,692
.....	130,856	.....	.....	.....	.....	.....	.....
.....	205,009	164,784	.....	.....	.....	1,982,022	1,870,046
.....	187,243	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1,643,403	1,660,688	4,668,519	2,884,130
.....	366,721	.....	.....	1,550,047	2,064,299	8,319,576	6,936,839
.....	444,709	.....	.....	2,034,490	2,249,521	6,599,804	6,880,715
.....	517,758	.....	.....	2,908,153	3,006,576	9,609,508	11,245,032
.....	741,593	706,498	.....	4,904,230	5,560,078	13,950,975	15,525,138
.....	.....	.....	.....	7,594,301	9,078,869	20,973,548	15,556,213
.....	1,037,000	977,664	198,848,000	8,582,810	9,202,241	.....	.....

* Returns included Van Diemen's Land.

† Exclusive of Port Phillip, previously included in returns.

VICTORIA.

he system of transporting convicts has never been applied to this
ny and the immigration has been entirely that of free settlers, and
the most part composed of enterprising men attracted there from
ferent parts of the world, many having emigrated from the United
ates during the time of the gold rush about the years 1850 and 1851.
This colony originally formed part of New South Wales, but was or-
anized into a separate government in the year 1851 and has grown and
rospered so rapidly as to rival the parent colony, New South Wales,
lthough very much smaller in point of territory. In 1855 they as-
sumed responsible government. The capital city is Melbourne, founded
about the year 1837 and now possessing 400,000 inhabitants. The
thoroughfares are broad and straight and lined with as fine buildings
as can well be found in any city of its size in the world. In contradi-
tinction to New South Wales, the Victorian government adopts a policy
of strict protection towards its manufactures. There is, notwithstand-
ing, a large import trade, as will be seen from the tables given else-
where. There are several other cities of importance in the colony, such
as Geelong, Ballarat, Sandhurst, etc., but Melbourne so completely
eclipses them and monopolizes the commerce of the colony as to nearly
put all the other towns combined out of calculation. In this connec-
tion it is curious to notice the strong tendency on the part of all the
colonies, except perhaps New Zealand, to centralize very largely; thus
nearly one-third of the population of New South Wales and Victoria is
contained in their respective capitals of Sydney and Melbourne, and a
very large proportion, in the case of South Australia, in its capital city
of Adelaide.

TASMANIA.

This island, which is situated about 150 miles south of the Australi
coast (Victoria), was first sighted in 1642 by one Tasman, who w
dispatched by Anthony Van Diemen, Governor-General of Java, on
exploring expedition, and who named it after the latter persona
which name it bore until 1856, when it was rechristened Tasmania
honor of its first discoverer. Its area is 160 by 170 miles, being abo
the same size as Ireland, exclusive of the small islands affiliated to
Captain Cook more than a century later (1777) visited the island, whi
was also touched at and partly surveyed and charted by various na
gators, such as Flinders, Bass, and Baudin, from the last-named ye
until 1802. The first settlement was made in 1803 by Lieutenant Bow
who landed a party of the more desperate convicts from Sydney.
year later about four hundred male convicts increased the settleme
these were originally intended for Port Phillip, the harbor of Melbour
but were transferred to Tasmania as being better suited for them
the opinion of Lieutenant Governor Collins, the first Lieutenant-G
ernor of Tasmania. The site of this settlement is now Hobart, a l

and prosperous town. The settlement went through a long period of adversity, owing principally to the lawless, thriftless, and drunken character of its inhabitants; but on the advent of free settlers from England, who were induced to immigrate by the offer of grants of land from the Government, a better condition of affairs gradually grew up, until in 1821 they had a considerable export trade in meat, wool, and wheat, the population then amounting to 7,400. At the close of 1836 the population had risen to 40,000, while the imports were valued at £585,000, and the exports at £320,000.

In 1856 the colony assumed responsible government and elected representatives and a ministry. In 1881 the population was 115,705 persons. Tin and gold mining have been very successful in this colony, one tin mine alone, the Mount Bischoff, having since 1871 paid its shareholders over three quarters of a million sterling in dividends, while a similar amount has been received since 1877 by the proprietors of the famous "Tasmania" gold reef, situated near Launceston. Both mines are still in full working order, and producing annual yields of proportionate value. In all, during fifteen years past, the total value of gold mined in Tasmania has exceeded £1,000,000, and of tin £5,000,000 sterling. Extensive coal fields also have been found.

SOUTH AUSTRALIA.

This colony was settled as a British possession, in consequence of Captain Sturt having sighted what is now the city of Adelaide, in 1831, while proceeding from New South Wales down the Murray River in two small boats. But it was not until the year 1836 that the home Government took over the management of the colony entirely and appointed Governor Gray. In 1843 the population was about 15,000. Of sheep they had 300,000 and 24,000 cattle. The gold discoveries in New South Wales and Victoria, however, nearly denuded the infant colony of her male population, who repaired to the diggings *en masse*, and by draining the banks of nearly all the gold coin they held caused a crisis which almost ruined the prospects of the young settlement before it had fairly started. The difficulty was, however, overcome by the government passing the bullion act, which provided that the banks might issue notes which should become legal tender, against their receipt of bullion brought in by the miners under escort, and assayed, valued, and stamped to a standard equal in purity to that coined by the English mint, the value being fixed at the rate of £3 11*s.* per ounce. In one year, 1852, the gold sent in to be converted into ingots amounted to £1,395,208 sterling.

In 1851 the first constitution was granted to South Australia, which in 1856 was followed by a new one granting them a parliament, and the first responsible ministry took office. In the year 1881 the census showed a population of 279,865, excluding the aborigines, while the revenue was £2,171,987. Imports, £5,224,064, and exports, £4,407,757.

There were over 283,000 cattle, nearly 6,500,000 sheep, and 150,000 horses. The fiscal policy of the colony has tended in the direction of giving increased protection to its manufactures, and a parliament was elected in 1887 which proceeded to carry out this policy to a greater extent than theretofore.

WESTERN AUSTRALIA.

Up to the year 1820 no attempt had been made to settle this portion of the continent, although several navigators had touched on the coast at various points. At this time, however, and for the next few years, surveys were undertaken of the coast, and in 1826 a party of soldiers and convicts were sent by the Governor of New South Wales to occupy King George's Sound, so as to be beforehand with the French, who were thought to be preparing to take possession of the country.

In 1829 Swan River was settled by Captain Stirling, and shortly after emigrants arrived in the ship *Calista*, followed in quick succession by a number of vessels bringing passengers, live-stock, and goods; and this may be said to be the beginning of the colony's history.

The returns made at this time by Lieutenant-Governor Stirling assessed the population at 850. The colony experienced the usual changes from prosperity to depression at varying intervals, and according to the wisdom and judgment, or otherwise, displayed by its leaders, until the year 1848, at which time the condition generally of the country was greatly depressed, and the colonists petitioned the home Government that convicts should be sent out, hoping thereby to introduce cheap labor and some money, and also to furnish a market for their produce. The request was acceded to, and in June, 1850, the first shipment arrived.

It was also agreed that an equal number of free settlers should be introduced, and consequently shipments of free immigrants followed those of criminals from time to time. It was considered that the general effects of this system were beneficial to the colony, and aided materially in increasing the population and production, and as the times of the transportees expired, and they became free men and entitled to most of the benefits belonging to the free settlers, no very marked increase in crime appears to have occurred.

About this time discoveries were made of coal, lead, and copper. Guano was also found on the islands, and shells of the pearl oyster; and an export trade commenced in horses and lumber about the year 1851. From this period until 1883 various exploring and surveying parties were sent out, and a mass of extremely valuable information was collected relating to the physical aspects of the interior. The marked increase in the population and production of Western Australia was shown by the census taken in December of that year, which fixed the number of inhabitants at 37,100, exclusive of aborigines. The imports were valued at £516,846 and the reports at £447,010. This country still remains

Crown colony, and has not yet attained the stage considered desirable before entering upon the responsibilities of self-government. In 1885 much excitement was caused by the discovery of gold in the upper Kimberly district, situated on the upper waters of the Elvira River, but considerable difficulties have been experienced in the development of that territory, owing to its distance from any commercial center and the expense and danger incurred in reaching the diggings. Generally speaking, however, the reports made in 1886 from the new gold field were encouraging.

QUEENSLAND.

Captain Cook appears to have been the first navigator of whom any authentic record is extant who drew England's attention to this vast territory by dropping the anchor of his ship *Endeavour* in 1770 in the waters of Morton Bay. He was followed by Flinders in 1779, and again in 1802; and King in 1818, all of whom gained additional information as to the coast and the openings into the interior by water. This territory formed a portion of New South Wales at this time and for long afterwards, just as did the now separate colony of Victoria; and as the convict establishments in Sydney were considerably overstocked with prisoners, it was with a view to their relief that in 1823 an expedition was dispatched from the latter place to select a suitable site. Mr. Oxley, the leader of this exploring party, entered and examined the Brisbane River for this purpose, and also went northward as far as the Bremer, a tributary of the former. Upon receipt of his report he was in 1824 intrusted with establishing a new settlement, which he successfully did on the banks of that river, and almost where the present town of Brisbane now stands; and in 1825 another shipment of the worst convicts was landed in charge of military commanders. The occupation of these prisoners consisted principally in road making, and this continued up to the time when free colonization set in.

In 1840 convict immigration was brought to a close, and in 1842 the country was thrown open to free settlement and the convict establishments removed. Up to 1846 various surveys were made and the country opened up. Settlers and immigrants continued to arrive until in 1856 the Morton Bay district, as it was then called, had a population of 17,842. In 1858 Rockhampton was made a port of entry, and a year later Brisbane declared a municipality. Up to this time considerable agitation had taken place in the matter of separating from the mother colony, New South Wales, which had been vehemently opposed by the latter; but in the year of 1859 the attainment of this object was completed and the name of Queensland bestowed on the new colony by the Queen. The first governor, Sir George Bowen, was sent out, and he landed in Brisbane on the 10th of December, when the new establishment was officially proclaimed to the intense satisfaction of the colonists. In 1861 the first census was taken and disclosed the popu-

lation as numbering 30,059. These figures were followed in 1864 an gave it as 61,467, exclusive of blacks, thus showing more than a doul ling of the inhabitants in three years. In 1865 the first Queensland rai way was opened, and sheep stations had increased and extended as fa as 700 miles west of Brisbane and 800 miles north of Rockhampto In 1870 the population had increased to 115,567. The land under tillag was over 52,000 acres. In 1877–'78 a severe drought occurred throug out the colony, causing great depression and losses among the pastora agricultural, and mining classes.

In 1884 mining was brought prominently forward to the public min owing to very satisfactory results being reported from some of the gol fields, and much speculation took place, which caused those districts t be rapidly opened up and settled; and in 1886 the discovery of gold i the northern part of Western Australia caused great excitement, and rush of diggers from Queensland took place. The population this yea had increased to 343,768.

NEW ZEALAND.

New Zealand is situated about 1,200 miles southeast of Australia an is composed of three islands—the North, the South, and Stewart Is ands. Of these the two former are of considerable area, and the latte one, which forms the southern extremity, is small. Several small group of adjacent islands belong to this colony. The navigator Tasman firs discovered the group in 1642, but made no landing in consequence c hostile demonstrations on the part of the natives. He sailed along it western coast and finally departed without taking formal possession i his country's name. In 1769 they were visited by Captain Cook on th first of the voyages with which his name has been so famously assoc ated. It was not until 1813 that any attempt was made at settlement and then by a missionary with a small following. These formed friendl relations with the Maoris, or natives, and made a treaty with severa chiefs, by which the British sovereign was recognized as their rule In 1839 the New Zealand Company fitted out an expedition under Co onel Wakefield, who established a colony at Wellington, the presen capital. Other settlements followed, but were entirely the efforts private enterprise, undertaken with the consent of the British Gover ment.

The city of Auckland was selected as the capital by Lieutenant-G ernor Hobson in 1840, but in 1856 the seat of government was chan to its present location, at Wellington, as being more central. In 1 this colony assumed responsible government, being in this regard same as the other Australian settlements.

The colony comprises sixty-three counties, the nine original provin having been thus subdivided. The climate is agreeable and heal Minerals abound and are profitably worked, while the coal beds practically inexhaustible and of fine quality.

GEOGRAPHICAL LOCATION OF THE COLONIES.

Western Australia occupies, as its name suggests, the whole of the western portion of the continent, the ocean bounding it on the north, south, and west. On the east it is bounded by the colony of South Australia.

South Australia stretches through the whole of the center of the continent, its northern and southern boundaries being the ocean. On the west it is contiguous to Western Australia. On the east it is bounded by Queensland, New South Wales, and Victoria, the eastern boundary of all of which is the Pacific Ocean, New South Wales lying in between the other two, Queensland being to her north and Victoria to the south.

Tasmania is an island 150 miles south of Victoria, separated from it by Bass's Strait.

New Zealand lies about 1,200 miles to the southeast of Australia, and is bounded on all sides by the South Pacific Ocean.

The Fiji Islands, recently annexed, are about 1,000 miles nearly due north of New Zealand, and east of northern Queensland.

The island of New Guinea lies about 60 miles off the northeast coast of Australia and was annexed by Queensland in 1883, but not confirmed by the Imperial Government. In 1884, however, the southern coasts were proclaimed a British protectorate.

The relative proportions in area of the Australian colonies may be gathered by comparing them to the whole continent, thus:

	Parts.
Australia equals	100
Victoria has	3
New South Wales has	10
Queensland has	23
South Australia has	30
Western Australia has	34

The term "Australia," strictly speaking, applies only to the above-named colonies, the word "Australasian" being used when, together with the above, are included the islands of New Zealand, Tasmania, and the smaller islands contiguous to each colony.

Tonnage of vessels entered and cleared, 1886.

Colony.	Inward.		Outward.		Total shipping.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
New South Wales	2,684	2,114,618	2,755	2,143,986	5,439	4,258,604
Victoria	2,307	1,848,658	2,324	1,887,329	4,631	[illegible]
Queensland	918	557,026	977	[illegible]		
South Australia	959	770,[illegible]				

Public debts, revenues, and expenditures of the colonies.

Colony.	Year.	Debt.	Revenue.	Expenditure.
New South Wales	1888	£44, 495, 349	£8, 582, 810 (1887)	£9, 202, 241 (1887)
Queensland	1887	23, 320, 850	2, 810, 147 (1886)	3, 202, 430 (1886)
South Australia	1887	19, 168, 500	2, 014, 107 (1887)	2, 145, 035 (1887)
Tasmania	1887	4, 109, 370	594, 976 (1887)	668, 759 (1887)
Victoria	1888	34, 627, 282	6, 733, 826 (1887)	6, 561, 251 (1887)
Western Australia	1888	1, 280, 700	377, 903 (1887)	456, 897 (1887)
New Zealand	1884	32, 860, 982	3, 707, 488 (1884)	4, 101, 318 (1884)

Railway and telegraph returns for each colony, 1886.

Colony.	Railway.		Telegraph wires.	
	In use.	Building.	In use.	Stations.
	Miles.	*Miles.*	*Miles.*	*Number.*
New South Wales	1, 935	267	20, 797	425
New Zealand	1, 809	171	11, 178	375
Queensland	1, 155	637	14, 443	282
South Australia	2, 120	2, 097	10, 310	200
Tasmania	303	138	2, 353	144
Victoria	1, 753	316	10, 111	420
Western Australia	154	46	2, 658	38
Total	9, 229	3, 672	71, 850	1, 884

Railway extension is continually going on in the colonies, though only to a limited extent in Western Australia and Tasmania. A main trunk line now connects the capital cities of Brisbane, Sydney, Victoria, and Adelaide, and its completion on to Perth, the capital of Western Australia, is early looked for. It thus skirts the eastern and southern seacoast of the continent. From Sydney to Melbourne the through line has been in operation since 1883. The express time averages about eighteen hours. Owing to a different gauge of track having been adopted by the colonies of Queensland, New South Wales, and Victoria, the journey has to be broken, and passengers and baggage transferred at each border station. This does not apply, however, to the colonies of Victoria and South Australia, both having the broad gauge. In Queensland the narrow gauge is used, and in New South Wales the ordinary or intermediate. Much discomfort, loss of time, and labor is occasioned by these differences, and it is probable that ere long one uniform track for the whole country will be adopted.

In Queensland several trunk lines start from the coast and penetrate westward a considerable distance. In Tasmania a line intersects the island and connects Launceston in the north and Hobart, the capital, in the south. In New Zealand several lines connect the principal cities. It is expected that Western Australia will soon be largely opened up *by the iron* road.

Each colony is linked to the others by overland telegraph lines and by submarine cables, while two cables afford ready communication with the mother country. A cable in the Pacific Ocean via Fiji, Vancouver, and Canada overland lines to England is spoken of as being probable at an early date.

Telegraph stations, post-offices, and money-order offices are to be found in every place of any importance, and are being continually added to. The coinage is similar to that of England. House rent, clothing, and manufactured articles generally are higher than in England, while meat and bread are cheaper. Wages paid to mechanics and laborers are much higher, with regular employment for steady, efficient men. Good domestic servants are in great demand, at high rates, as are also agricultural laborers.

Value of imports of principal articles, 1886, *exclusive of New Zealand.*

Articles.	New South Wales.	Queensland.	South Australia.	Tasmania.	Victoria.	Western Australia.	Total Australia.
Woolen and woolen piece goods	(*)	£116,644	£100,986	(*)	£987,127	(*)	£1,204,757
Silks	(*)	10,511	(*)	(*)	312,728	(*)	323,239
Cottons	(*)	134,123	(*)	(*)	1,027,674	(*)	1,161,797
Drapery	£2,887,111	468,782	257,301	£462,619	.....	£114,137	4,610,558
Haberdashery	(*)				420,608		
Dress:							
Apparel and slops	1,270,519	191,795	145,079	(*)	389,814	17,569	2,014,276
Boots and shoes	582,313	155,132	86,061	52,280	105,828	16,050	997,664
Hats, caps, and bonnets	(*)	56,856	(*)	(*)	122,377	2,027	181,260
Hosiery	(*)	34,139	(*)	(*)	132,192	(*)	166,331
Bags and sacks, including wool packs	66,699	23,530	33,604	21,106	86,638	6,759	241,336
Food:							
Fish	102,991	31,543	21,063	1,366	163,830	.....	320,793
Flour and biscuit	657,270	398,435	883	5,689	16,429	20,327	1,099,033
Grain:							
Wheat	220,287	2,691	13,728	50,148	26,237	228	313,319
Oats	143,229	30,310	26,772	102	76,456	7,632	284,501
Rice	91,641	48,605	11,423	6,385	84,107	2,065	244,226
Fruit, including currants and raisins	288,752	103,972	23,782	15,433	205,553	8,718	646,190
Potatoes	260,563	62,187	16,978	.....	362	4,528	344,618
Sugar and molasses	502,044	16,664	233,753	75,499	853,419	45,023	1,726,402
Beer, cider, and sherry	419,454	158,222	56,892	8,942	260,650	28,790	933,950
Spirits	492,553	201,582	93,656	29,249	378,883	19,823	1,215,746
Wine	109,680	40,734	16,500	9,763	116,606	5,869	299,152
Tea	311,547	122,089	94,104	35,077	668,472	29,599	1,260,888
Coffee	20,721	3,922	12,011	2,379	50,222	1,329	90,584
Tobacco, cigars, and snuff	220,896	91,509	55,589	23,180	291,684	11,987	694,845
Wool	279,686	.....	734,687	.....	2,331,599	.....	3,345,972
Leather and ware	67,710	27,542	10,102	13,859	167,618	942	287,833
Timber	448,466	61,701	131,086	26,347	1,170,539	14,031	1,852,170
Coal and coke	22,549	15,275	99,564	37,349	515,929	2,423	693,089

* Included under the head of "Drapery."

Value of imports of principal articles, 1886, *exclusive of New Zealand*—Continued.

Articles.	New South Wales.	Queensland.	South Australia.	Tasmania.	Victoria.	Western Australia.	Total Australia.
Gold:							
Bullion	£1,462,695	.....	.....	.....	£569,442	} £17,500	£3,153,646
Specie	371,336	£370,080	£245,000	£85,000	32,593		
Live-stock	700,953	327,451	200,884	53,961	928,505	8,383	2,220,137
Butter and cheese	203,044	{ 32,014 / 37,182 }	.....	.....	.....	18,503	290,743
Bacon and hams	54,393	.....	.....	.....	.....	.....	54,393
Meats, preserved	32,929	.....	.....	.....	.....	12,089	45,018
Malt	149,866	.....	.....	.....	.....	.....	149,866
Copper ore	152,471	.....	.....	.....	.....	.....	152,471
Tin ore and ingots	442,514	.....	.....	.....	.....	.....	442,514
Hardware	617,249	246,875	.....	121,102	.....	.....	985,226
Books and newspapers	.....	53,142	.....	39,486	.....	.....	92,628
Musical instruments	.....	41,027	.....	.....	.....	.....	41,027
Preserves	.....	33,583	.....	.....	.....	.....	33,583
Opium	.....	56,182	.....	.....	.....	.....	56,182
Furniture	.....	62,512	21,636	.....	.....	.....	84,148
Jewelry	.....	52,401	.....	.....	54,310	.....	106,711
Machinery	.....	166,349	.....	.....	.....	.....	166,349
Government and military stores	.....	205,016	196,923	97,379	.....	.....	499,318
Barley	.....	.....	11,278	.....	.....	.....	11,278
Manure	.....	.....	.....	17,103	.....	.....	17,103
Gloves	.....	.....	.....	.....	111,086	.....	111,086
Hops	.....	.....	.....	.....	23,285	.....	23,285
Hides and skins	.....	.....	.....	.....	129,102	.....	129,102
Paper	.....	.....	.....	.....	251,116	.....	251,116
Oils	.....	.....	.....	.....	219,691	.....	219,691
Glassware, etc	.....	.....	.....	.....	263,048	.....	263,048
Iron and steel	.....	.....	.....	.....	844,801	.....	844,801
Fencing wire	.....	.....	.....	.....	.....	12,894	128,894

GEOGRAPHICAL POSITION OF AUSTRALIA.

The geographical situation of the Australian colonies being directly on the opposite side of the world from Great Britain, the United States, and other manufacturing centers, would at first sight appear to present obstacles to any large amount of trade and commerce with those countries. But it is not by any means certain that this very fact, taking into account all the circumstances and conditions connected with it, is not after all favorable to their steady increase, as the laws of supply and demand can be better regulated and attended to where the distance compels a considerable period to elapse between the time goods are ordered and received, while the same fact, implying as it does proportionate expense of carriage and of the employed capital lying idle, would present a barrier to any large amount of goods being thrown on the markets, causing a consequent depression. The enormous increase in the value of imports shown by the tables given herewith is astonishing, and proves conclusively that, notwithstanding the presence in large

quantities of coal, iron, and other metals throughout the colonies, they are essentially pastoral and agricultural communities, and must remain so for many years to come. Some of the colonies, and notably Victoria, by the adoption of a vigorous protective tariff, have endeavored to build up internal manufactures, and not without some measure of success, more especially in boots and shoes and clothing, yet the import statistics show how small in proportion to their wants and consumption are the values of goods of purely home production.

Then, again, Victoria suffers from having no coal fields that amount to anything, and this alone is a heavy obstacle to manufacturing. The coal is mainly brought from the coal fields of Newcastle, New South Wales, a distance by sea of some 550 miles.

The United States trade with the colonies is only in its infancy, and is capable of immense development. The reasons, however, of its not growing in the same ratio as that of Great Britain are many. In the first place there is no direct steam communication between our eastern coast and the colonies, and indirect only via London or Hamburg, in which cases the merchandise has to be trans-shipped at either of those ports, generally involving much delay, damage, and loss through the extra handling, and also costing considerably more in freight. This item in itself puts many of our goods at a disadvantage as compared with those from England. Then, again, our manufacturers regard their domestic trade as far more important, which no doubt it is, than any export business, and but few of them study the latter carefully; whereas, England, having but a small home market, lays herself out expressly for foreign and colonial trade, and by her care in manufacturing the articles expressly required in the colonies, and not seeking so much as we do to plant her own styles and peculiarities there—her methods of packing goods, shipping, invoicing, and otherwise showing every care and exactness in complying with the customs in vogue amongst the colonists, cater well for them and render it extremely difficult for the United States, or any other country, to supplant her. In addition to this, the political ties which bind the colonists to "home" are a strong incentive to continue business relations with her, all other things being equal, to the exclusion of foreigners. The trade next in importance to that of Great Britain is that of the United States, and is no doubt somewhat due to our kinship in race and language. The trade with this country is in such articles as petroleum, turpentine, lumber, slates, and oils, where her natural advantages give her a superiority, notwithstanding the drawbacks before mentioned.

In articles of woodware, in leather and leather manufactures (except boots and shoes, where the styles are different to what the colonists adopt), in certain lines of tools, locks, builder's and other hardware, and in wood-working and mining machinery, where the versatility and ingenuity of the American manufacturers are exhibited; in carriages and carriage material, canned fruit and fish, and "notions" generally—in

all these things the United States has a large and increasing trade. One trade peculiarity of the colonists must be mentioned—it is very important to take it into account in seeking their custom—and that is the extreme difficulty in getting them to purchase brands or makes of goods new to them and different to what they have been accustomed, even if such goods appear to be equal in quality and are cheaper. This would lead one to infer that the people, as a rule, are not given to exercise their own individual judgment in examining articles for sale, and this is true to a certain extent, though it should rather be put down to the characteristic British conservatism and caution. They prefer as a rule to call for some well-known brand or name of anything they are about to purchase, relying for its quality on its fame, and are not prone to make experiments on their own responsibility. In axes, for example, the great bulk of which are brought from the States, in one colony one brand is called for, and in another a different one; thus care has to be exercised in shipping the proper brand to the proper colony, because, although the two brands may be equally good and cheap, they will only sell readily in their own respective localities. The same principle holds good all around.

We have had for some years past a line of steamers running from San Francisco to New Zealand and Australia, but they have not been able to carry to advantage any goods manufactured east of the Mississippi, as the heavy overland freight to San Francisco puts them out of competition. This line has received no aid from the states, but has been paid a mail subsidy of £30,000 a year from two of the colonies, viz, £20,000 from New Zealand, which lapsed last year (1888) and has not been renewed, and £10,000 from New South Wales, which continues for the present year (1889). Without any doubt this trade would grow to very important dimensions could our Government be induced to act as liberally towards the line as the colonies even, who are, as it were, strangers and foreigners, in the matter of ocean postage service, and thus recognize not only the actual work rendered in providing a swift and frequent interchange of mails between the two countries, but the far more important work of providing the needful facilities for building up a trade which is very profitable to the Pacific coast and indeed to the whole country, as by its means a large, important, and increasing market has been opened up for our fish, fruit, grain, and other produce, and manufactures. This line has been maintained with difficulty, and belonging as it does to wealthy owners has been kept up more as a matter of pride and courage than because of its being of a profitable nature.

We must bear in mind that the territory of these colonies is as vast as that of our own; that the population bids fair to exceed 30,000,000 souls in less than a generation; that already its consumption per capita far exceeds that of any other country in the world; that it is essentially a pastoral, agricultural, and mining country; and that our pur-

chases of their wool, hides, and other products are made entirely through England, and shipped through that country, paying tax and tolls to them. These staples could be brought directly home to our own shores, and there is no doubt in the world that in a short time the trade both ways would assume enormous proportions; and the wonder would remain why it was that a people so keenly alive to their own interests as ours should have so long looked on with apathy to this magnificent avenue of commerce.

If steam communication to Australia from the Pacific coast can be made to even pay expenses with the comparatively small quantities of goods they can ship from there, and with no state aid from our side and but a small subsidy from the New South Wales government, which shortly lapses, there can be little doubt that with even a moderate protection from our Government, in the shape of a mail subsidy, a similar enterprise from New York with her large shipments of goods to those markets would prove remunerative, and I hope and believe the time is not far distant when our eyes will be fully opened to the paramount importance of entering into a far closer relation with our Australian cousins. I think there is no doubt that any mail subsidy voted by Congress under suitable provisions, and supplemented by the necessary alterations in our restrictive shipping acts, would be further added to by some of the colonies, and would be sufficient to insure a good and permanent service. That the future of the Australian colonies will be one of marvelous prosperity and progress no man at all acquainted with its resources, capabilities, and the excellent characteristics of the inhabitants as a race, can for a moment doubt. They are favorably disposed towards us, and to neglect an early opportunity of allying ourselves closer to them in the bonds of friendly trade and commerce would be a national blunder which we should ever after regret.

CLIMATIC CONDITIONS.

Nearly three-fifths of Australia lies to the southward of the tropic of Capricorn and consequently comes within the southern temperate zone, which also embraces the ocean-girt colonies of New Zealand and Tasmania. These are the only lands within the belt, if we except the Cape Colony and the extremity of the South American continent. Thus about one-third of all the land included in this vast region is comprised in the Australasian colonies.

The corresponding division in the northern hemisphere should embrace nearly the whole of North America, Europe, nearly all of Asia, and a portion of Africa. The comparison thus given will afford some idea of the extent of this division of the globe and of the enormous proportion of ocean as compared with land—a proportion which is not without an important climatic effect. So large a portion of the country being thus placed within the temperate belt, which the history of the world shows is the natural home of the dominant man, involving

just such changes of temperature as conduce to robustness of health, energy, industry, and the utmost exercise of the mental faculties, and avoiding alike the extremes of heat with its enervating influences, and of cold with its stinting hand, seems to be especially adapted to the growth of a fine type of physical and mental manhood; and that this is so can easily be seen by any one traveling through Australasia and noting the general physique of the native born proper.

There is no doubt that the climatic influences are favorable to the production of a hardy and courageous race of men, and the fact of nearly every day in the year throughout the whole of the territory being available for out-door pursuits tends to robustness of physical culture probably unequaled elsewhere.

The love of Australians for athletics of all kinds and their dexterity and prowess in out-door sports are of world-wide renown.

Taking it all around there are but few countries in the world where the general conditions of temperature are more favorable to the production of a superior race.

Very respectfully,

F. B. WHEELER,
Assistant U. S. Commissioner.

To Hon. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON FINANCE AND TRADE.

By A. B. ROBINSON, Esq., *of Melbourne.*

One of the most important features in the history of the world's trade during the past forty years has been the creation of new and extensive markets in the South Pacific. Prior to 1850 the commercial and financial operations of the Australasias were too insignificant for even ordinary attention. A limited population, no inconsiderable proportion of which being represented by the convict element, had few wants, local production was small and financial affairs were confined almost entirely to government departments. The discovery, however, of rich alluvial gold deposits in Victoria during 1851 had the immediate effect of drawing a large influx of population from all parts of the world, resulting in increased demands for goods of all descriptions, and the establishment of a trade which has ever since been expanding until it has become an important feature in the mercantile transactions of almost every producing country. When it is remembered that cities had to be built, and an ever-increasing population to be maintained for a number of years from outside sources, the significance of the situation will be understood. The discovery of gold in Victoria was at a time when the Australasias had been somewhat depleted of their immigrant population by the attractions of California. Local production was mainly confined to wool growing and stock raising, and even these industries were, in comparison with the present, developed only in their initial stage; hence the wants of the new markets created by the rush to the gold fields opened a large and satisfactory outlet for the produce of older countries. Great as was the attraction of the gold discoveries, the permanent influence on trade has been the steady and progressive development of the local resources of Australia. The settlement of the continent was followed, as the rich auriferous deposits were exhausted, by the expansion of production in numerous directions. In February, 1867, Victoria, with a view of fostering industries, adopted a protective policy, and from that date has steadily advanced her commercial importance. South Australia, Queensland, and New Zealand at later periods

favored the same fiscal system; but as yet New South Wales, owing to her peculiar position, remains attached to what is called free trade, though she imposes discriminating duties on sugar and kerosene to favor local production.

The growth of the Australasias has not, however, been wholly dependent on local resources. Large sums have been borrowed in London by the various colonies for the construction of public works, the largest proportion of which being expended in the formation of railways, all of which are owned by the state. Including New Zealand, the total public debt of the Australasian colonies amounted at the close of 1886 (latest official summary) to £153,209,998; of this amount Victoria expended 93.09 per cent. of her portion on reproductive works; South Australia, 84.35 per cent.; New South Wales, 82.69 per cent., and the lesser colonies in a more limited proportion. It may be argued that these borrowings, which are equal to £44 14*s.* 5*d.* per head of the population, are somewhat excessive and are likely financially to have a grave influence on the advancement of the colonies. And this would be true if the loans had been expended to any great extent on unproductive works; as a fact known, however, and especially in Victoria, these state borrowings are fully represented by "live" assets, returning interest compatible with that paid for the loans; indeed, so far as the colony named is concerned, the investment of foreign borrowings in local works leaves a fair annual margin of profit to the state after paying interest on the sums expended on working expenses. Financially, therefore, the operation of borrowing has proved to be a sound one, whilst local enterprise has not been crippled by the absorption of local monetary resources in works which the state can carry out. Again, these foreign borrowings have led up to others, and an extensive monetary relation and business in its multitudinous channels has been stimulated by the introduction of the outside element. Indeed, there is no denying the fact that Australasian industries have to no inconsiderable extent been built up on British capital, it being computed that including their public debt this investment of English money in the Australasias amounts to no less than £230,000,000 sterling. On this sum interest has to be paid, and its provision naturally has its influence on the trade of the respective colonies. Against this accumulation of debt the Australian colonies produced gold between the years 1851 and 1886 estimated at no less than £324,097,228. Of late the gold fields have fallen off, but Mr. James P. Kimball, Director of the United States Mint, still classes Australasia second in the list of gold-producing countries of the world, the United States heading the list.

The figures already given indicate that the financial business of these colonies must have expanded in proportion, and this is very plainly shown in the advance in banking business. The first Australian bank (Bank of New South Wales) was founded in 1817. In 1825 its capital was only £9,000, whilst to-day the paid-up capital is £1,250,000 and it

possesses a reserve fund amounting to £930,000. Although the advance of this single institution has been exceptional, the impetus given to banks of later years is a clear proof that the profits made by these institutions are large, whilst the business they embark in is both safe and satisfactory, as proved by the few failures which have occurred over a lengthened period. According to the latest returns, the total paid-up capital of the Australasian banks is now £15,935,872, holding reserves in addition amounting to £7,427,000. The note circulation of these institutions is returned at £5,588,020, whilst the business done as represented by these advances to the public is no less than £133,141,274. Although these figures when compared with the operations of older and more populous communities may not appear large, still, when it is remembered how comparatively short a period is covered by the history of Australian finance, it indicates a progressive development both rapid and satisfactory. Within the present decade the development of the mineral resources of the Australian continent has resulted in the discovery of extensive silver and tin deposits which at no distant date must influence its trade.

Apart, however, from the production of precious metals, the cultivation of land, the increased growth of cereals, and the expansion of wool growing and stock raising have materially enhanced the value of the Australian trade. During the earlier history of these colonies they were dependent in a great measure for their supplies of breadstuffs on California and Chili, a large import trade being done both in wheat and flour from the Pacific ports. All this is now changed, South Australia, Victoria, and New Zealand all having entered into the class of exporting countries. In 1850 the colony of Victoria produced only 525,190 bushels of wheat, and until 1876 had to import from 1,000,000 to 2,000,000 bushels annually to meet the wants of the country. In 1877 the total production was 5,279,730 bushels, and since that date her exports have been considerable, amounting in 1884, a favorable season, to no less than 8,232,605 bushels. Taking the history of Victoria for the thirty years between 1857 and 1886, the actual exports of wheat exceeded the imports by 3,500,000 bushels, and as the whole of this increased production occurred during the last ten years the influence it has had on the trade of the colony is noteworthy. The seasons are, however, variable, and continuous droughts often result in heavy losses. To meet this evil a system of irrigation works, based on the principle in use in California, has been adopted by the state, which, when fully carried out, will doubtless tend to mitigate the disasters inflicted on farmers in dry seasons. American enterprise in connection with irrigation has been favorably viewed by the various colonies, and Messrs. Chaffey Bros. have received special concessions from the governments of Victoria and South Australia for these purposes. Two settlements are in course of development for the cultivation of fruit and cereals, from which satisfactory results are expected. As an indication of the progress of agriculture in Victoria and its bearing on the trade

of the colony it may be stated that the actual value of the purely agricultural produce in 1886–'87 was computed at £7,260,735. Wool, however, is the product *par excellence* which rules the Australian trade; and notwithstanding occasionally bad seasons, it grows more than any other country in the world. The clip of 1885 was computed at no less than 405,261,460 pounds, being the largest production of any country in the world. Of the group New South Wales is the largest producer, New Zealand next, whilst Victoria stands third on the list; but the superior quality of what are known in the trade as "Port Phillip wools" enables the last-named colony always to obtain a relatively higher price for her clips than the other colonies. The actual mercantile value of the wool product of Australia necessarily depends on the market fluctuation in Europe and America; but take a fair season of prices it may be roughly estimated at £20,000,000 sterling, and as this is always represented by bills drawn on London it affords one of the largest items in the exchange account with foreign countries. Tallow, hides, leather, and skins are adjuncts of the wool business which swell the list of annual imports. The total exports of home produce of the various colonies, however, do not show a very large increase during the past ten years, but this may in some degree be accounted for, first, by the fall in values, and next by the larger consumption at home. In 1876 the value of Victoria exports of home produce was estimated at £10,153,916, and in 1885 at £12,432,245; New South Wales, £10,691,915 in 1876 against £12,957,881 in 1885, the other colonies showing about the same progress; the advantages possessed by New South Wales in being a coal-producing country of course has a marked influence on the value of her export, while the annually increasing trade done between Newcastle and San Francisco swells its volume. The return trade with the United States indicates that Victoria is cultivating this branch of her business, and should the water-way via Panama become an accomplished fact there can be no doubt that it will be permanently extended. In 1876 the value of the imports into Victoria from the United States was placed at £414,996, whilst in 1886 it had increased to £755,896. The principal imports are timber, kerosene oil, and agricultural machinery, New York and Boston being the ports which transact no inconsiderable portion of this trade. From the west coast, San Francisco and Puget Sound do an annually increasing business with the Australias, timber, tinned fish and fruit, barley, maize, and in certain seasons flour and wheat forming the larger items. The trade, however, may be said to be in its infancy, but as the growth of population brings with it increased wants it is fairly certain that the interchange of products between the two countries must expand.

The question naturally arises at this point, what can Australia consume? Taking the mean average value of the imports for eleven years for the continent only, it is returned at £44,469,374, and if New Zealand and Tasmania are included it is increased to £53,589,477 annually,

while during the latter five years is shown a steady increase. It need hardly be said that these figures clearly prove that the capacity for consumption is large, and that the Australian trade is worth competing for, more especially as of late there are indications favorable to more extended business relations with the United States. In proof of this it may be stated that several of the leading firms of Melbourne and Sydney have branch establishments or agencies in New York and San Francisco, while a regular line of sailing vessels trade between Boston and New York and the Australian colonies. The direct trade in wool is yet small with the United States, the larger proportion of her purchases being made in the London markets, but still there is a growing business. In 1886–'87 the direct shipments from Melbourne to America amounted to 10,021 bales, while in 1887–'88 the quantity had been increased to 18,847 bales; in addition to these shipments were made to New York and Boston via London in 1886–'87 to the extent of 4,788 bales and 3,922 bales in 1887–'88.

The increase of stock has been of late years enormous throughout the Australian colonies; indeed, no small proportion of the wealth of these colonies is represented under this head.

The following table shows the number of sheep, cattle, and horses, estimated by Mr. H. H. Hayter, the government statist of Victoria, in his report of November 12, 1888, to have been in Australasia at the latest dates for which statistics are available:

Live-stock in Australasia.

Colony.	Sheep.	Cattle.	Horses.
Victoria	10, 623, 985	1, 333, 873	315, 000
New South Wales	46, 965, 152	1, 575, 487	390, 609
Queensland	12, 926, 152	4, 473, 716	305, 865
South Australia	7, 254, 000	440, 000	170, 000
Western Australia	1, 909, 946	93, 544	41, 100
Total	79, 679, 235	7, 916, 620	1, 222, 574
Tasmania	1, 547, 242	147, 092	29, 528
New Zealand	16, 677, 445	895, 461	187, 382
Grand total	97, 903, 922	8, 959, 173	1, 439, 484

As regards sheep, these figures show an increase of 11,000,000 compared with those of the previous year. New South Wales shows an increase of 7,800,000, Queensland of over 3,200,000, and South Australia of 600,000. Victoria and Tasmania both show a slight decrease. The number of cattle in all the colonies shows an increase of 700,000 and horses of 67,000.

The question of the balance of trade between Australia and the outside world has always attracted notice. In the opinion of the many—which are those who have not carefully considered the conditions of a new country—it has been deemed adverse and tending towards impov-

erishment. Taking results as they stand, the reverse has however occurred, and this is due to the fact that a large proportion of the importations are represented as permanently held in finished condition, and really are investments and not expended wealth. Taking the ten years between 1875 and 1885, the official returns show an excess of imports over exports amounting to £61,406,810; but in the period referred to the assessed value of house property, railway construction, cost of machinery for manufacturing, mines, and other purposes, and outlay on reproductive public works, the materials for which, such as telegraphic communication, tramways, bridges, and the like, are imported, fully make up the difference; while the monetary balance is represented by the loans floated during this period and the investment purely of foreign capital. Again, as the interest only has to be returned on loans which are represented in the import list by goods—no gold coming to the colonies—it follows naturally that the true balance of trade can be sustained even in the face of an apparent discrepancy between the value of the exports and those of the imports.

One of the marked features in the Australian trade has been the increase of the shipping business. In 1874 the tonnage entered and cleared in the Australian ports proper amounted to 4,800,640, whilst in 1885 it touched 10,697,793. Including Tasmania and New Zealand, the figures were for the first period 5,824,976 tons, and for the latter 12,407,999 tons. Of the vessels trading with the Australian colonies it is noteworthy that those under the United States flag occupy the second place. The British flag is credited with 8,351 steamers and 28,646 sailing vessels, or a total of 36,997 vessels, representing a tonnage of 9,697,706 tons. Under the United States flag 3,075 steamers and 15,210 sailing vessels are classed, with a total tonnage of 2,664,600 tons. Of late the shipping trade between the United States and Australia has been increasing, and will doubtless expand as the trade relations between the two continents progress.

Another of the most striking features in the internal trade of Australia within the last decade has been the extension of local manufactures, more particularly in Victoria. According to the official statistics, the value of raw materials operated on in 1880–'81 amounted to £7,997,745, whilst the estimated returns of articles manufactured were £13,370,836. In 1887 this number of establishments had increased 11 per cent., and the value of the plant, building, and land 37 per cent. The actual estimate of the value of the output of the various establishments, according to the census returns of 1885, had advanced to £24,070,000, and as the progression has been steady since that date it may now be estimated at nearly £30,000,000. New South Wales, Queensland, and Victoria are the largest customers for home-made products, and in return the latter colony draws almost her entire coal supply from New South Wales, whilst Queensland finds in Victoria a market for her surplus sugar output. Local production of late years has to some extent altered the

character of imports; but the demand for all descriptions of goods not home-produced have so increased that there has been no falling off in the outside trade. On the contrary, the improved condition of the population has naturally induced a larger spending power, and this is very clearly marked by the increase in the revenue derived from the custom-house; but, whilst the community has of late years spent more money, its savings have also steadily increased. In 1888 the total amount of money standing to the credit of depositors in savings-banks in the various colonies was £12,482,868, and since this date the increase has been exceptionally large, a result due, in a great measure, to the high average rate of wages paid for all descriptions of labor. The actual wealth of the population may best be estimated from the total returns of the colony of Victoria, which are as follows:

Amount deposited with—	1882.	1886.
Banks	£23, 625, 093	£31, 259, 472
Savings-banks	3, 121, 246	3, 589, 966
Building societies	1, 038, 034	2, 910, 792

From the foregoing it will be seen that in Victoria alone there is an increase of more than £10,000,000 sterling in the deposits for the four years, and this rate of progression has to a lesser extent been shared by the other colonies of the group. The most interesting item in the returns of this portion of the finances of Victoria will be found in that referring to the national wealth. The official statistics show that between 1872–'76 it was estimated at £144,000,000, or £185 per head for the entire population; between 1877 and 1881 it had grown to nearly £187,000,000 or £223 per head. These figures indicate only property held by private individuals, and have no reference to the sums represented by the state and municipal expenditure on public buildings, railways, telegraphs, and the like. The aggregate value of private property held in New South Wales doubtless exceeds that of Victoria, whilst the other colonies are considerably less. But sufficient has been advanced to show the extraordinary strides which the Australias have made during the last thirty years, and the important position the South Pacific continent is assuming in the trade relations of the world. The normal increase only of the next ten years will materially increase the consuming power of these colonies, and competition for the trade will increase. Already Germany is looking for prospective advantages, and is cultivating business relations by subsidizing a regular line of steamers to Australian ports; France has the Messageries Line, and the United States control the mail service via San Francisco. The outlook is suggestive, and hardly likely to be overlooked by the traders of the United States.

MELBOURNE, *January* 21, 1889.

REPORT ON LAND LAWS.

By GEORGE B. NASEY, B. A., LL. B., *of Melbourne.*

In the following pages it is proposed to set forth, in a manner as free from technicalities as the subject will permit, the present condition of the law in the various Australian colonies relating to the alienation of Crown lands. An endeavor will be made to describe, in a succinct and general way, the different forms of tenure under which the Crown lands in the colonies may be held, and the conditions under which such lands may be obtained. It will be impossible, within the limits to which this paper is necessarily confined, to enter into any of the details of procedure required by statute to be observed by applicants for Crown lands; for such details the reader must refer to the various land acts to be found in the statute-books of the colonies. By way of illustration and to give the treatment of the subject practical interest, some statistics will be given of the extent of area actually alienated, and of the area in occupation under the various forms of tenure adopted by the colonial legislatures.

HISTORICAL SKETCH.

Before entering upon the task of describing the present state of the law with regard to the Crown lands of Australia, it will be well to make a cursory review of the early history of the foundation and constitution of Australia as a portion of the British Empire, for by this means one will be enabled to trace the changes in the law relating to the lands of the Crown in this country, and finally arrive at the condition in which it is to be found at the present day.

In the first place, then, it is to be observed that the land of Australia was acquired for the British Crown when Captain Phillip, an officer commissioned for that purpose by the Government of His Majesty King George III, landed on its shores in January, 1788, and, planting the British flag on the soil, proclaimed that he took it by virtue of his commission for and on behalf of His Majesty the King. The lands thus authoritatively taken and acquired became the lands of the Crown, and

their disposition lay entirely within its grant. So that from the very earliest history of the country the land has been in the hands of the Crown, and all owners at the present time trace the title to their property to an original grant from the Crown, though the land may have passed through several intermediate hands between the date on which it was originally granted by the Crown and the time when its present owner became possessed of it.

The colony founded by Phillip, and carried on by his immediate successors, was named New South Wales, and included the whole of the area now occupied by the two colonies of New South Wales and Victoria. The government of this new colony was administered by a Governor, usually a military or naval officer of high rank, assisted by a council of advice appointed by the English Government. The enormous area of land at the disposal of the Crown through its representative the governor, and the small number of colonists then resident in the country, together with the desire the Government had that the land should be settled upon, brought about the grants of large areas to individual colonists for the purpose of grazing sheep and cattle. In this way land was in the early days of Australia's history alienated by the Crown with a very lavish hand.

Some of the earliest legislation to be found in the British statute-books having relation to the Crown lands in Australia is embraced in an act passed in the year 1833, the fourth year of the reign of King William IV, by which it was provided that commissioners of Crown lands in the colony of New South Wales should be appointed by the governor to prevent the intrusion of trespassers on Crown lands, and to prevent unauthorized occupations thereof from being considered as giving any legal title thereto. From this it may be gathered that at that period the Crown was beginning to set a higher value on its enormously extensive estates than it had done previously, when it was so liberal with its grants. As the colony grew in importance and its population increased, the expense of carrying on the administration of government became correspondingly heavier. By way of providing a means for meeting this increasing demand upon the public exchequer, the lands of the Crown within the colony were looked upon as convertible into a reliable and substantial revenue. With this object in view, therefore, an act was passed in England in the year 1842, by which power was given to the governor to sell Crown lands at an upset price by auction; or failing in that, by private contract. No provision was made at that time for letting Crown lands on lease for a term of years. Shortly afterwards, however, in the year 1846, another act was passed, and by this act provision was made for the granting of leases of Crown lands for a term of fourteen years, and also for the granting of licenses for occupation. The proceeds derived from the sale of Crown lands, under the act 5 and 6 Victoria, c. 36, as well as the rents obtained from leases under the later act, were appropriated

as to one moiety to the public service, as to the other moiety to a fund for immigration purposes. The Crown continued to obtain a revenue in this way for the administration of colonial affairs until the year 1855, when acts of the British Parliament were passed conferring on the colonies of New South Wales and Victoria, which had been separated from the former in the year 1851, the forms of constitutional government which they enjoy at the present day. By these acts, which are known as the constitution acts of the respective colonies, the bicameral form of government was introduced, with an upper house or legislative council, and a lower house or house of assembly. The provision of the constitution act which principally affects the subject with which we are dealing in this paper is that by which a civil list is granted to the Crown in lieu of the Crown revenues, territorial and otherwise, from whatever source arising, and to the disposal of which the Crown was entitled. Thus by their constitution acts the colonies of New South Wales and Victoria have acquired the absolute right of disposal of the waste lands of the Crown within their respective boundaries.

We have thus so far traced, somewhat roughly it may be, yet with sufficient detail for our present purpose, the course of legislation affecting the alienation of Crown lands, from the date of the foundation of Australia as a colony of Great Britain, up to the time when the privileges of a free constitutional government were granted to the colonies of New South Wales and Victoria. By this grant to them of a constitution establishing them as free and independent states, these colonies may be said to have attained their political majority. From that period onwards each colony has legislated for itself, and as each has the power of disposing of the undisposed of Crown lands within its borders, so each has exercised that power in the manner which appeared to it to be most conducive to its interests. The conditions under which the two colonies stand with regard to land differ at the very outset, for while there are more than 300,000 square miles of land in New South Wales, in Victoria there are less than 90,000 square miles. Then again the character of the land in the two colonies differs, that of New South Wales being adapted for grazing purposes, while that of Victoria is more suitable for agriculture. In both cases, however, as indeed in all the Australian colonies, the course of land legislation has been in the direction of providing simple means for the settlement of the population on the lands of the Crown, granting in the first place leases subject to certain conditions of residence and improvement, and subsequently, on certain fixed payments being made, granting the land in fee to those settled upon it. The principle adopted and followed in all the colonies of Australia has this in view, though the mode of its application is different in each case, the difference between them being rather in matter of detail than of principle.

This being the case, it will be sufficient if we examine somewhat in detail the course of legislation with reference to the alienation of Crown

lands in Victoria, with reference, where occasion may require, to the course of that legislation in the other colonies of the Australian continent. Before, however, proceeding to consider the acts of the parliament of Victoria, dealing with the alienation and occupation of the lands of the Crown, it should be stated at the outset that these acts do not relate to or affect those portions of the Crown lands of this colony which are known to contain auriferous reefs or alluvial gold deposits. All such land is especially excepted from the operation of the general land laws, and the means of obtaining licenses to mines or leases to occupy such lands is provided for in various mining statutes, with which we do not propose to deal in this paper.

VICTORIAN LAND LEGISLATION.

There is at present in force in the colony of Victoria but one land act, viz, that of the year 1884. But though it would be possible to obtain within the four corners of that statute the whole of the existing land law of the colony, still as that act repeals former ones, under which rights had been acquired, and as those rights thus acquired have been expressly reserved by the act in question, it will be well to consider briefly the various land acts which have, from time to time, found their way into the statute-books of the colony of Victoria.

The first statute relating to Crown lands which was passed in the parliament of Victoria, after that colony had acquired a constitution of its own, was one entitled "An act for regulating the sale of Crown lands in the colony of Victoria," and was passed in the year 1860. Its preamble sets forth the object of this act to be "to make better provision for the disposal of Crown lands, and to afford greater facilities than have hitherto existed to persons desiring to engage in agricultural pursuits." This act was shortly afterwards repealed, and the law consolidated by Act No. 145, passed in the year 1862, the object of which was to amend and consolidate the laws relating to Crown lands, and to give increased facilities for the sale and settlement of such lands. By this act the system of obtaining allotments of Crown land, by selection of areas containing from 40 to 640 acres, was introduced. Certain areas of Crown lands were proclaimed by the governor in council as being open for selection for agricultural purposes. The successful applicant for a selection might buy one moiety of the allotment at £1 per acre, and obtain a lease for the other moiety for a term of eight years; he was bound to cultivate within one year 1 acre at least in every 10. Those portions of the Crown lands which had not been proclaimed as agricultural areas might be sold by auction at a fixed upset price. By another part of this act provision was made whereby leases and licenses might be obtained of Crown lands for other than pastoral or agricultural purposes, such as for the planting of vineyards, hop gardens, and the cultivation of other useful plants. Licenses were also obtainable to seek for minerals other than gold, and for other specified pur-

poses. In all dispositions of Crown lands under this act, whether by sale, lease, or license, water easements were reserved. Licenses for the pastoral occupation of runs were also provided for, but no license was granted for a run sufficient to support five thousand sheep or twelve hundred and fifty head of cattle. These licenses were put up for sale at auction, and the bidder of the highest premium obtained the license for fourteen years; and as these runs were for purely pastoral purposes, the licensee was prohibited cultivating more than might be sufficient to supply himself and his establishment with vegetables, hay, etc.

This act received considerable amendment, particularly in reference to the sale of Crown lands by selection, by Act No. 237, passed in the year 1865. As the act of 1862 and the amending act of 1865 were both repealed by the land act of 1869, No. 360, it will be unnecessary to consider their provisions any further. Though the act of 1869 has been itself repealed by that of 1884, yet, as many rights have accrued under the former act, and as they have been specially preserved by the latter, it will be consistent with the plan of this paper to consider, somewhat in detail, the provisions of the act of 1869, and the act of 1878 by which it was amended.

In the first place it must be observed that the alienation of Crown lands is based upon the same principle in these acts as was first adopted by the act of 1862, but the systems of leases and licenses was extended in its application by the later acts. Under the act of 1869, as amended by that of 1878, there were provided three different forms of alienation of Crown lands, the form adopted in each case being dependent upon the purposes for which the land was proposed to be employed. There were first of all licenses granted by which the licensee was licensed to occupy one allotment not exceeding 320 acres in area; such licenses were for a term of six years at the annual fee of 1 shilling per acre. A license was held subject to certain conditions, by which it was stipulated, amongst other things, that within six years from the issue of the license the licensee should inclose his allotment with a good and substantial fence, and cultivate during the currency of his license at least 1 acre in every 10. The licensee was bound to reside on and occupy his allotment during the continuance of the license, and to make improvements on it to the value of £1 per acre. By the payment of a fee of 2 shillings per acre per annum a "non-residence license" was obtainable, in which case the licensee was under no obligation to occupy his allotment. When a licensee had been in occupation for six years, and had paid all the fees due by him, he could demand a lease from the Crown of his allotment, for a term of fourteen years, at the annual rent of 1 shilling per acre, and at the expiration of that period he could demand a grant in fee simple from the Crown. So that what at first was a mere license to occupy became, under certain conditions, converted into a lease, and finally into a grant of an estate in fee simple.

Secondly, it was provided that all the lands of the Crown in Victoria

might be sold by public auction, not exceeding 200,000 acres in any one year, at an upset price of at least £1 per acre. For this purpose quarterly auction sales were held, of which notice was given to the public; the purchaser of Crown lands at any such sale obtained as his title a grant from the Crown; one-quarter at least of the purchase money was to be paid as a deposit at the time of sale, the balance to be paid in one month, otherwise the deposit to be forfeited and the sale void. As in the earlier acts, so in this one, provision was made for the granting of leases and licenses for other than agricultural or pastoral purposes, such as for the purpose of quarrying stone, for removing guano, etc. In all conveyances of Crown lands to purchasers the right to water easements was reserved to the Crown, although not expressly so stated in the grant.

Yet another mode of obtaining the use of Crown lands provided by this act was by way of purchasing at auction a license to occupy portions of such land for pastoral purposes for a period of fourteen years. Crown lands thus occupied were known as "runs," and the area that would be occupied under such a license by one person was such an area, and no more, as would be capable of carrying all the year round four thousand sheep or one thousand head of cattle. The licensee's interest in such a license was transferable with certain formalities, and the license was liable to be revoked on breach of the conditions under which it was held, one of these being that no more of the land comprised in the license should be cultivated than was sufficient to provide for the licensee's own requirements.

Finally, all lands alienated under the provisions of this act were liable to be resumed for mining purposes by the Crown on payment of full compensation to the licensee, lessee, or purchaser in fee for the value of the improvements made by him. Several short acts were passed amending the principal act of 1869 in matters of detall, but not affecting the main principles on which the system of alienation of Crown lands was based by that act. It will therefore be unnecessary to refer further to them.

PRESENT CONDITION OF THE LAND LAW (VICTORIA).

Having dealt, thus far, with the land laws of Victoria as they affected the alienation of Crown lands in that colony before the year 1885, and having traced the course of legislation from the earliest period up to that time, we now come to deal with the condition of the land law as it at present exists in the colony. The law relating to the sale and occupation of Crown lands is to be found in Act No. 812, which came into force on the 29th day of December, 1884. By this act the whole of the unalienated lands belonging to the Crown are divided into the following eight classes, namely: (1) Pastoral lands; (2) agricultural and grazing lands; (3) auriferous lands; (4) lands which may be sold by auction; (5) swamp lands; (6) state forest reserves; (7) timber reserves; and (8) water re-

serves. The area of land comprised within each of these classes is delineated on maps of the several counties in which the land is situated, which maps are referred to in a schedule to the act as the "deposited maps." The area in each of these several groups, except the fourth, may be increased from time to time by proclamation of the governor in council. By this it will be seen that the area of Crown lands that may be sold by auction is a fixed quantity, and can not be increased except by act of parliament. Certain areas of Crown land may be reserved from time to time for public purposes, and such reserved land can not be sold, leased, or licensed. From the list above given it will be seen that the policy of this act is to limit the amount of land that is alienated from the Crown in fee, but to give increased facilities to persons desirous of occupying the lands of the Crown for pastoral or agricultural purposes, and yet reserving the ultimate remainder in fee to the Crown itself. It is proposed now to take each one of these kinds of land found in the list given above, and to place clearly before the reader in plain language the provisions of the existing act with regard to them in turn.

The pastoral lands of the colony are divided into "pastoral allotments," varying in size and having a grazing capacity of from one thousand to four thousand sheep or from one hundred and fifty to five hundred head of cattle. None of the pastoral land can be alienated in fee simple, but it is open to be leased. Public notice is given that a certain pastoral allotment is to be leased at a certain rent, and the first person who makes application has the right to a grant of the lease. But if two or more make application for the same allotment on one day, then the right to a lease of the allotment is put up for sale by auction, and he who bids the highest sum by way of premium has the lease knocked down to him. The rent payable under such a lease is at the rate of 1 shilling per head of sheep, and 5 shillings per head of cattle; the number of sheep or cattle is determined by the grazing capacity of the allotment upon a basis of not more than 10 acres to a sheep and the equivalent number of acres for cattle. The rent is paid in moieties in advance every half year. The lease contains covenants that the lessee will not assign; that he will destroy vermin upon the land; will keep in good condition and repair all houses, fences, etc., on the property; and will not cut any timber thereon except for the purpose of fencing and building. The lease thus obtained may be for any term of years, provided that it shall expire not later than fourteen years after the date of the act, *i. e.*, December, 1884. The lessee of any pastoral allotment may select out of his allotment not more than 320 acres for a homestead at the rate of £1 per acre.

The second class into which the unalienated Crown lands are divided is that including agricultural and grazing lands. These are divided into portions varying in size, but not exceeding 1,000 acres in area, which are denominated "grazing arear." None of this land can be sold, but leases of "grazing areas" are given for any term of years,

provided that the term shall expire not later than fourteen years after December, 1884. Any person who is not a selector under any land act previous to the present one may obtain a lease of one grazing area, but no more. Out of his "grazing area" the lessee may select not more than 320 acres in one block for agricultural purposes. This selection is designated an "agricultural allotment," and a license will be issued to the selector to occupy this allotment. Any person not under eighteen years of age may take up a grazing area or an agricultural allotment. The rent to be paid for a grazing area varies from 2 pence to 4 pence per acre per annum, but is more if, at the commencement of the lease, there are any substantial and permanent improvements on the property. The covenants contained in a lease of a grazing area are similar to those contained in a lease of a pastoral allotment, already referred to. On the expiration of the term of the lease of "a grazing area" the incoming tenant must pay to the lessee the value of improvements made by the latter during the currency of the lease. No license to occupy an agricultural allotment will be granted to any person applying as trustee or agent for another. The fee for such a license is 1 shilling per acre per annum, and is payable half yearly in advance. The licensee is prohibited from assigning the license, and is bound to destroy vermin on the property. He is also under the obligation to fence the boundaries and to reside upon the allotment. When the license has been in force for six years and all the conditions have been complied with by the licensee, he is entitled to demand a grant of the fee upon payment of 14 shillings per acre, or instead of this he may demand a lease for fourteen years at a rent of 1 shilling per acre per annum. At the end of this term, or at any time before that, on payment of the difference between the amount of rent actually paid and £1, the lessee may demand a grant in fee of the land leased. Thus what at first was only a license grows into a lease, at the end of six years, and finally at the end of twenty years it becomes a grant in fee simple; the land is in fact purchased at £1 per acre, but the payments are extended over a term of twenty years. A license may be obtained for an agricultural allotment free from the condition as to residence and occupation, but the annual fee payable in this case is 2 shillings per acre instead of 1 shilling. Such a license as this, called a "non residence license," may be converted into a lease and finally into a grant in fee; but the total amount paid per acre in this case is £2 instead of £1. Not more than 50,000 acres can be licensed in this way during any one year. For the purpose of encouraging the cultivation of vineyards, hop gardens, and orchards, facility is offered to licensees and lessees of agricultural allotments for purchasing 20-acre blocks to be planted with vines, hops, or fruit trees.

The only right that can be acquired under this act with regard to auriferous lands is an annual license to reside on and cultivate a block of 20 acres of such land, and a license to occupy for grazing purposes

for five years not more than 1,000 acres of these lands. Not more than 100,000 acres of Crown lands can be sold by auction in any one year; the upset price is at least £1 per acre, and the purchase money is payable one-fourth at the time of sale, and the balance in twelve equal installments, falling due every three months and bearing interest at the rate of 6 per cent. per annum. The proceeds of these sales are devoted to railway purposes.

Provision is made for the drainage of the swamp lands of the Crown, and when so drained and reclaimed they are leased in allotments of 160 acres for a term of twenty-one years, the lessee covenanting to keep open drains and canals during the term of his lease. Licenses are obtainable to cut timber or for grazing or residence on the state forest reserves, but no estate in such lands can be acquired.

MALLEE COUNTRY.

In the northwestern district of the colony of Victoria there is a large extent of country, comprising about 10,000,000 acres, densely covered with a scrub called the Mallee Scrub, which affords cover for immense numbers of wild dogs and rabbits that are a pest to the surrounding country. This district extends to the bank of the river Murray, and is commonly known as the Mallee Country. To provide for the occupation of this district, the soil in which when cleared of the scrub is very fertile, and in order to encourage the destruction of the vermin that occupy it, an act of parliament was passed in the session of 1883, entitled "An act to regulate the pastoral occupation of the Mallee Country in the northwestern district of Victoria." For the purpose of settlement this country is divided into two classes of areas called, respectively, "Mallee blocks" and "Mallee allotments," the latter being on the southern and eastern borders of the Mallee Country. Each mallee block is divided into two portions, one of which may be leased for twenty years from the date of the act, and the other occupied for five years. These mallee blocks are situated immediately to the north of the mallee allotments, and extend up to the bank of the Murray River, and vary in area from 10¾ square miles to 583 square miles. The annual rent of a mallee block leased under this act is computed at the rate of 2 pence per head on the average number of sheep and 1 shilling per head on cattle for the first five years, to be doubled for the second five years, and to be further increased 50 per cent. for the remainder of the term. Leases of mallee blocks are acquired by the highest bidder at auction, or, in the event of there being no bidder, by the first applicant who may apply for the same and pay the annual rent. The rent is payable every half-year, and the lessee is bound to destroy within three years of the granting of the lease all vermin and to keep the land free from vermin, and further to keep in good condition and repair during the continuance of the lease all houses, fences, and other improvements. If the lessee has made any improvements on the portion of his lease held under the five

years' tenancy, he will be entitled on its expiration to compensation to the amount actually expended by him. For money expended on the construction of wells and other similar permanent improvements calculated to increase the grazing capacity of the land the lessee is entitled to compensation.

ADMINISTRATION OF THE LAND LAWS (VICTORIA).

The administration of the land laws of the Colony of Victoria is under a board called the "Board of Land and Works," consisting of from three to seven members. The president of this board is one of the responsible ministers of the Crown, who holds office as the minister of lands. There may be one or two vice-presidents of this board, who must also be ministers of the crown; the other members of the board are appointed by the governor in council. The estimated area of the colony of Victoria is 56,245,760 acres. Of this area 4,915,898 acres are occupied by state forests, reserves, roads, etc.; 1,691,315 acres are occupied under lease for pastoral purpose, and 11,535,500 acres, known as the Mallee Country, leased for pastoral purposes under the special Mallee act; and there have been reserved or alienated, less forfeited lands, 22,489,-383 acres, leaving an area open for selection, including mountain forest lands, of 15,613,664.

NEW SOUTH WALES.

The free selection of Crown lands before survey was introduced into New South Wales by the Crown lands alienation act of 1861. This act, with those amending it, was eventually repealed in 1884, when the act was passed which, with certain amendments, sets forth the present condition of the land laws in that colony. By this act of 1884 the whole of the colony was divided into three great divisions, called the Eastern, Central, and Western divisions, respectively. For the purpose of administration of this act, these divisions are again divided into land districts, each district having a local land board that hears applications for land under the act; appeals lie from the decisions of local land boards to the Minister of Lands, whose determination is final. The land in the Eastern and Central divisions is open for conditional purchases in blocks of from 40 to 2,560 acres. The conditions under which purchases of these blocks may be effected are, that 2 shillings per acre shall be paid on application; the purchaser to fence the boundaries within two years, and reside for five years on this land. The balance of the purchase money is payable at 1 shilling per acre annually, such payments to commence after three years from the application. At the end of five years the purchaser may, if he choose, pay the balance of purchase money then due and obtain a grant from the Crown. Land may be taken up in this way, but without the condition of residence; in this case, however, the payments required are double those where this condition is inserted.

CONDITIONAL LEASEHOLDS (NEW SOUTH WALES).

Every occupier of land under a conditional purchase may, by virtue of his purchase, obtain a conditional leasehold having an area three times that of his purchase; in the Eastern division the total area which can be held by one person under conditional purchase and conditional leasehold is 1,280 acres; in the Western division, 2,560 acres. The rent payable for the lease is to be a fair rental, determined by the local board, and is at least 2 pence per acre per annum. When the lease has been running for five years the lessee has the option of buying any portion of the land, or of having the lease extended for another five years. Land in any of these three divisions of the colony may be taken up under pastoral leases for terms varying from five to fifteen years according to the position of the land. The minimum annual rents vary from one penny to three half-pence per acre. Instead of taking up a pastoral lease, the selector may apply for a homestead lease of land in the Western division. The area thus obtainable varies from 5,760 acres to 10,240 acres in extent. The lessee of a homestead lease must reside on the land for six months in each of the first five years, and must fence the boundaries of the land within two years. Such leases are for a period of fifteen years, which, however, may be extended, the rent payable being the same as for pastoral leases in the Western division. From this sketch of the land law of New South Wales it will be seen that larger areas are obtainable on lease and at a lower rent than in Victoria, a condition of things that was to have been expected, seeing the enormous extent of country available in the former colony as compared with that in the latter.

In the year 1887 there were sold 10,374 acres of country lands at the average price of £1 10*s.* 7*d.* per acre. The number of selections taken up under the conditional-purchase system was 4,769, embracing an area of 293,004 acres. From the year 1862 to the end of 1887 the number of selections has been 207,449, and the area selected 26,266,860 acres. The total area of land alienated from the Crown unconditionally from the foundation of the colony to the end of 1887 was 22,372,072 acres.

SOUTH AUSTRALIA.

In the year 1886 all the land acts previously in force in the colony of South Australia were repealed, and the laws relating to the alienation of Crown lands in that colony were consolidated. The act by which this was effected, entitled "The Crown Lands Consolidation Act No. 393," has for its object the simplification and codification of the numerous regulations affecting the disposal of Crown lands and introduces some new provisions for the taking up of land. By this act the whole of the unalienated lands of the Crown in this colony are divided into four groups, in which are included, respectively, country, town, suburban, and improved lands. All sales of land are made by auction. The

minimum upset price per acre for country and improved lands is £1, the purchaser to reside on the property. Payment of the purchase money is extended over a period of twenty-one years, but the purchase may be completed at the end of ten years on payment of the balance due. During the first year the selector must cultivate one-tenth of the property and one-fifth each succeeding year. Improvements to the value of 10 shillings per acre are to be made during the first four years, and the assignment of the property is prohibited until the purchase is completed. In the case of town and suburban lands, which are sold by auction, the terms of payment are for cash within a month. Country lands, which are described as scrub lands, may be leased in blocks of not more than 3,200 acres for any term not exceeding twenty-one years, with the right of purchase after ten years, the leases being put up for sale by auction, the lessee to reside on the property, and payments of rent to be credited against the purchase money. Leases may be obtained of large blocks up to 20,000 acres for grazing and cultivation purposes, at a rent of not less than one half-penny per acre, for a term of twenty-one years.

NORTHERN TERRITORY (SOUTH AUSTRALIA).

The Northern Territory, which lies between the one hundred and twenty-ninth and the one hundred and thirty-eighth meridians of east longitude and north of the twenty-sixth degree of south latitude, and which, until the year 1863, formed part of the colony of New South Wales, was, in that year, annexed to South Australia, and its administration placed in the hands of a government resident. From that time until the year 1882 several acts were passed affecting the alienation of Crown lands in that portion of the colony. In the last-mentioned year, however, the acts previously in force were repealed, and the laws on the subject of Crown lands were consolidated. By the act then passed a person may select and purchase, on a system of extended payments, 1,280 acres of land at 12*s.* 6*d.* per acre, to be paid within ten years; country lands may also be purchased for cash at the same price without conditions. Pastoral leases are granted, to the first applicants, of blocks not exceeding 400 square miles in area, for a term of twenty-five years. For the encouragement of plantations for the cultivation of rice, sugar, tobacco, etc., areas of from 320 to 1,280 acres may be leased at the annual rent of 6 pence per acre. After the occupation and cultivation of such blocks for ten years, the lessee is entitled to a grant in fee, the rent already paid being accepted as purchase money. For the purpose of mining for any mineral except gold, blocks of 1 square mile may be obtained on a lease for fourteen years, at half a crown per acre per annum. The amount of land alienated from the Crown in South Australia proper from the date of the foundation of the colony to the end of the year 1887 was more than 9,500,000 acres, while, during the same period, the area alienated in the Northern Territory was about

500,000 acres. There remained at the end of the year 1887 in the hands of the Crown, in South Australia, about 234,000,000 acres of land subject to alienation; and in the Northern Territory about 100,000,000 more than this.

QUEENSLAND.

In Queensland the administration of the land laws is placed under the control of a board consisting of two persons appointed by the government, who form a land court, having extensive jurisdiction in all matters relating to leases and sales of Crown lands. The system of alienation which obtains in that colony is in the main similar to that adopted in the other colonies already referred to. The areas obtainable are, however, greater, and the leases run for longer terms. For grazing farms blocks of from 2,560 acres to 20,000 acres may be selected, and a lease for thirty years obtained on complying with certain prescribed conditions, while in the case of agricultural farms the area obtainable ranges from 320 to 1,280 acres on a lease for fifty years. After continual residence for ten years on an agricultural area, and on payment of certain fees the selector may demand a grant in fee of the land. Encouragement is offered to persons desiring to immigrate to this colony, for land orders to the value of £20 are granted to those who pay their own passage to the colony, and also to their children over twelve years of age, while to children between one and twelve years of age land orders of the value of £10 are granted. These orders are not transferable, and must be used within six months after arrival, but are available for ten years from the date of issue for the payment of rent of either an agricultural or a grazing farm. It should be stated that the minimum rent for agricultural farms is 3 pence per acre per annum, and for grazing farms 3 farthings per acre, while the price per acre, if purchased, is at least £1.

The returns up to the end of the year 1887 are: Number of agricultural selections, 2,632; area included therein, 533,726 acres; rent, £8,871 6*s.* 2*d.* The number of grazing selections up to the same date was 187, covering an area of 774,731 acres, and producing a rent of £4,051 13*s.* 1*d.*

WESTERN AUSTRALIA.

The colony of Western Australia is divided for the purpose of alienating Crown lands into six divisions. As is the case in Victoria licenses may be obtained for the occupation of Crown lands, and these licenses after a certain time—five years—are exchanged for leases, at the expiration of which the lessee may demand a title in fee. The price that is alternately paid per acre is not less than 10 shillings, and the quantity of land obtainable in this way by any one person is from 100 to 1,000 acres. A condition of residence on the land is imposed on the lessee, unless he chooses to pay double the price for the land. The maximum area obtainable by one person is different in the different

divisions of the colony. Under certain conditions blocks of from 5 to 20 acres may be obtained for the purpose of cultivating the vine, orchards, or gardens, at not less than 20 shillings per acre.

IRRIGATION.

This paper would not be complete without some reference being made to the Irrigation Colonies which have been established in Victoria and South Australia by the Messrs. Chaffey Brothers. By agreements entered into with the governments of those two colonies, and subsequently ratified by acts of parliament, large areas of land on the banks of the river Murray have been granted to these enterprising gentlemen on certain terms and conditions, to be improved and irrigated. The land obtained in Victoria is known as Mildura, in the northwestern portion of the colony, and contains a quarter of a million of acres. In South Australia the same area has been obtained at Renmark, which is situated on the Murray about 140 miles from Mildura. It is stipulated that the sum of £300,000 shall be spent on these properties within twenty years. At Mildura 50,000 acres have been already taken in hand, and a large quantity of pumping apparatus and other material for irrigation works are being erected. The area already taken up at Renmark is 30,000 acres. In both these "irrigation colonies," as they are called, the land is surveyed and divided into 10-acre blocks by wide streets, to be planted with the native fig tree and pepper tree. These blocks are subdivided into town, suburban, and agricultural lots, and blocks for fruit cultivation. The price for agricultural land is £15 per acre, and for land for fruit cultivation is £20 per acre. This includes the right to use the water provided by the pipes and canals which are laid and constructed by the irrigation company. In order to render facilities for settlement, the payment of the purchase money may be extended over a period of ten years. In relation to this subject, it may not be out of place to state the following, which is obtained from the report of the Victorian water-supply department on the Mildura irrigation colony:

Of the main irrigation channels, 13 miles have actually been completed, and there are 5 miles now in course of construction. The work of reticulating the town has also been commenced. Upwards of 1,000 acres have been cleared, and of this area 800 acres have been plowed and prepared for the planter. The present system of channels provides for the irrigation of 15,000 acres, and the pumping plants now in course of erection are designed on a correspondingly liberal scale. It is thought that ample provision is made for the requirements of the settlement for some years to come. The fencing completed during the year amounted to 60 miles, of which 37 miles consisted of wire netting, the balance being post and wire. An area of about 6,000 has been ringed during the year.

MELBOURNE, *April* 2, 1889.

REPORT ON LABOR ORGANIZATION.

By JULIAN THOMAS, Esq., *of Melbourne.*

The first attempt at labor organization in Victoria took place in the very early days of the colony. In the year 1847 a handful of working masons engaged in building a few houses in the township of Melbourne formed themselves into a "society." This combination was constituted for the purpose of "resisting any encroachment upon the rights of labor." Owing to the labor market of those days being, from a workman's point of view, entirely satisfactory, in that the supply was not equal to the demand, the power of the society was never tested. Under these circumstances labor organization languished, and with the discovery of gold, and the issue of licenses to mine, in September, 1851, it temporarily expired; for no sooner had the early colonists realized that gold existed in large quantities in Victoria, than for a time they became mad with the fever, the "*auri sacra fames.*" Not only did the masons throw down their chisels and the carpenters their saws, but the men also who employed them abandoned building operations, and master and laborer alike seized the pick and shovel and hastened in search of the precious metal. But the cry of "Gold!" brought thousands of men of all sorts and conditions to the colonies, many of them totally unfitted to become miners. The enormous prices paid for every description of skilled or unskilled labor soon caused many artisans to return to their trades, at which every man could obtain a far surer livelihood than the majority of the gold seekers. From the primal state of canvas tent and bark cabin, the mining townships sprang into pioneer cities built of brick, and stone, and weatherboard, and galvanized iron. Trade concentrated in these centers, necessitating the presence of its handmaiden, labor.

EIGHT-HOUR LAW.

The birth of labor organization in Victoria must therefore be dated from this time, and originated in the following rather curious manner: In the Australian midsummer of December, 1855, some twenty or thirty masons were engaged on a large building in one of the Melbourne suburbs. The rays of the sun beat pitilessly down upon them as they shaped the blocks of stone. It was nearing 3 o'clock, at which

hour, as at 11 in the morning, all outdoor workmen were by custom allowed a quarter of an hour's "spell," or, as they called it, "Smoke-oh!" as at this time nearly every man soothed himself with a pipe. The hour struck, and wiping their perspiring brows the men walked into the shade, and sitting down, "lighted up." Each complained of the heat, and of having traveled so far, only to work ten hours a day as in England. Suddenly one of the men, who had been puffing silently while the others complained, said from behind a heavy cloud of smoke, "Well, boys, what do you say if we stand out for eight hours a day?" There was no difficulty amongst the "boys" in coming to a decision that it was highly desirable, but the matter could not be settled off-hand. They decided to call a meeting of all the men engaged in the building trades, masons, brick-layers, plasterers—in all, nine different branches. This meeting was held in Collingwood, one of the principal suburbs of Melbourne, the home of a large proportion of the working classes. A resolution was passed to the effect that in all trades connected with building, eight hours should be recognized as a day's work. Thus it may be said that labor organization in Victoria began, although it certainly has not ended, in smoke.

The various building trades then gave notice to their employers that in future eight hours would constitute a day's work. The brick-layers and carpenters, who were the last to notify their masters, did so in March, 1856. The winter season being about to commence, the masters offered little objection, for at this period of the year it was impracticable to work much longer. They nevertheless asked for time to consider the demand of the men. A meeting of employers was held at the old Queen's Theater, at which a leading contractor took the chair. It was resolved that, provided a certain period was allowed to elapse in order that present contracts might be carried out, the eight-hour system should be agreed to. The only "strike" which took place in consequence of the men's demand, was one which lasted only a few days. This was at the Parliament House, the largest undertaking in the colonies. But the contractor gave in, within a week, and on the 21st of April, 1856, the men began to work under the new rule. This was the first great principle for which Victorian working-men were prepared to fight.

It was not the outcome of any particular man or set of men feeling the heat of the summer sun, although that may have brought matters to the deciding point. It was a firm resolve amongst men from an over-populated country, where no labor was adequately or fairly paid, that in this new continent, on the other side of the world, a fair day's work should earn a fair day's pay; that life should not merely consist in working to live, and living to work, but that a certain time of every day should be at the working-man's disposal for recreation and improvement. To commemorate the adoption in Victoria of this principle, a demonstration was organized to take place on Whit-Monday, 1856.

It took the form of a labor procession and fête. All the trade societies then in existence gathered on the spot where the dome of the present Centennial International Exhibition now stands, and marched through the principal streets of Melbourne to the recreation grounds then known as the "Cremorne Gardens." Here a programme of sports and games was carried out, a charge for admission being made. Finding, after paying all expenses, that a considerable sum remained in hand, it was decided by the committee of management to give this surplus to the Melbourne Hospital.

TRADES HALL.

The handing over of this substantial sum to the Melbourne Hospital developed another idea among Trades Unionists, the outcome of which marked a further step in the perfecting of their organization. This was the proposal to devote the proceeds of future demonstrations to the erection of a "Trades Hall." In the year 1857, the 21st of April was the day on which this demonstration took place. This date was the legitimate anniversary of the success gained by a proportion of Victorian working-men in the acknowledgment that eight hours formed a day's work. This success did not at that time extend to every trade, but each year it gained ground, and more unions came into existence. During the latter part of 1857 a provisional committee was appointed representing the various trades unions. This committee interviewed the government of the day with regard to a grant of land being made to them on which to erect the proposed hall. The government gave them the choice of three sites, each in an advantageous position. The committee of the trades unions decided on a block of about 2 acres, situated not more than a mile from the center of the city. About this time the engineers had a slight difference with their employers, and went out on a strike. They then included in their demands that the eight-hour system should come into operation in their trade. They had previously endeavored to gain this point about two years before, in 1856, but owing to a want of organization they failed to do so.

The strike in this latter instance lasted only a week, the masters yielding to the demands of the men in that time. Slowly yet surely the peaceful conquest was accomplished. The energy which characterizes all colonists the wide world over was in this case brought to bear upon the struggles of labor to gain a fair share in the prosperity of the country. The working-men had considerable power in their hands, and it is to their honor that they used it wisely and not harshly; that they showed themselves willing to work a reasonable time for a reasonable remuneration; that they determined that the future generations of the colony—their own sons—should build up an Australian nation where the laborer should be more than a mere machine; and finally that they took advantage of the lessons taught them in their old homes—lessons taught by poverty and hardship, but for this reason impressed the more deeply upon their minds.

In the month of September, 1858, a mass meeting of members of trades unions was held in Melbourne. A permanent committee was then elected, and a recommendation adopted that with a view of utilizing the ground granted to them, a wooden building should be erected thereon. Up to this time the various societies had met in a large room adjoining a suburban hotel, but the connections and surroundings were necessarily harmful, and it was felt by all that a building for the special purpose of trades meetings was urgently needed. The outcome of this movement was the erection of a wooden building at a cost of $5,000. This structure, which is still in existence and is now known as the "Old Trades Hall," was opened by a prominent member of the Masons' Union on the 21st of April, 1859. The erection of this building was a great step in the progress of labor organization in Victoria. It was a great advantage that all the trades unions in and around Melbourne met under the same roof in a building entirely their own. To a considerable extent it brought about the unity of the different unions, when it was desirable they should act together. Especially was this necessary during the four years almost immediately following the opening of the hall. From 1861 to 1864 the number of members belonging to trade societies fell off largely. The annual eight hour demonstration was poorly attended, and the number of men taking part fell from about 5,000 in 1859 to a little over 3,000 in 1863.

This falling off was attributable almost entirely to the dullness of trade at this time.

PROTECTIVE TARIFF.

In 1865, however, a great struggle began in Victoria, to the result of which it is perhaps right to assign a large portion of the present prosperous condition of the country. The colony in this year declared decisively in favor of a protective policy. Long before this, in 1860, colonial manufacturers had given evidence before a tariff committee that it was impossible for them to compete with outside producers unless a protective duty of from 10 to 25 per cent. ad valorem was granted to them. This statement was fully borne out during the following five years. So little was labor in demand that many workmen, skilled and unskilled, were unable to earn a living, and were obliged to appeal to charity in order to supply the wants of their wives and families. Although the nominal wages of skilled artisans ranged, according to different trades, from $1.50 to $2.50 per day, a large number of men were working for $1 a day. The gold fields afforded no opportunity of earning better wages, for few miners realized more than the above amount.

The agitation for protection, first seriously raised in 1865, gave at once an impetus to trade. Sir Graham Berry, at present agent-general of Victoria, in London, was at this time editor of the Geelong Advertiser. This city, about 45 miles from Melbourne, has about 22,000

inhabitants. Sir Graham Berry's advocacy of the cause of protection in his journal, and in the legislative assembly, of which he was a member, greatly aided this movement. It was also from the first persistently supported by the Melbourne Age, which, from a comparatively small organ of the masses, has become one of the most popular and powerful papers in the colonies, with a circulation of over 81,000 daily. Manufacturers, and employers generally, took heart at the energy with which protection was thus being advocated. The number of employers of labor in Victoria rose from 994 in 1865, to 1,923 in 1869. In 1866, consequent upon this increased demand for labor, trades unionism revived. The course of no great movement runs smoothly. Labor in Victoria has had to face hard times and bitter struggles, and in the natural progress of events may have to do so again. No union can withstand the cry of "No work," and in speaking of the years 1861 to 1864, as a time when the building up of labor organization in Victoria was not only stayed, but permitted to fall back, it must be remembered that with less work to be done, and consequently fewer laborers to organize, the task of progressing was an impossible one.

EXTENSION OF THE EIGHT-HOUR LAW.

With the return of good times, however, returned the energy of the working-men in seeking to foster in this country a sense of the justice due to the bread-winner. A vigorous attempt was made towards extending the eight-hour system. The timber trades, including all men engaged in any way in timber yards, gained this concession almost without a struggle. Another important body to make a move was that of the seamen. Owing to its being impracticable to adopt the eight-hour system while actually at sea, it was demanded and conceded that as soon as a ship was made fast to the wharf, the men should only work eight hours out of the twenty-four. Between the years 1872 and 1876 the strength of the eight-hour movement increased slowly but surely, laying thereby a firm foundation from which the working-men of Victoria will, it is considered, never be moved. With the year 1877 a remarkable extension of this system took place amongst all trades. Union after union succeeded in gaining the wished-for concession, and at this time there is only one body of workmen which does not participate in the advantages of it. These are the tailors, and as they are paid, almost universally, by piece-work, there is considerable difficulty in bringing the eight-hour system into force amongst them. They are not represented at the Trades Hall, but have an independent society of their own. Although not affiliated with the other organizations there is little doubt that in case of a strike upon reasonable grounds the tailors would be assisted by them.

In a brief manner the development of the eight-hour movement has thus been traced. But the achievement of this important object does not by any means complete the functions of labor organization in Vic-

toria. Many more principles have been included in its programme. Before pointing out these further attempts, and in many cases successes, it would be well to glance at the growth and constitution of the Trades Hall and the Trades Hall Council.

ERECTION OF TRADES HALL AND MEETING ROOMS.

The erection of the first Trades Hall in 1859 was looked upon only as a temporary effort by the labor organizations to found for themselves definite headquarters. But the dullness of trade in the early sixties did not warrant any additions to the original building; it was consequently not until the year 1873 that a determined effort was made to construct a permanent one. The amount of funds in the hands of the committee at this time was a little over $9,000. Plans were solicited for a building to contain a hall measuring 100 feet by 50 feet and a number of small rooms. It was to be a substantial structure in brick and plaster, and to cost about $18,000. To meet this outlay it was decided that the various societies and unions should lend the necessary sum. According to the extent and prosperity of the societies they lent amounts varying from $250 to $1,000. This new hall was completed and ready for occupation by the middle of 1874. By the end of 1877 the whole of the amount borrowed from the societies was paid off. The income which enabled the council to do this was derived from the annual eight-hour demonstration and the subscriptions of the trades unions, which are regulated as will be shown hereafter. But with the marvelous growth of Melbourne, and a national development throughout the colony, unequaled in the annals of the world, labor organization also gathered strength, and the number of members joining unions, and of unions themselves, increased wonderfully. The year 1881 found the accommodation of the then building wholly inadequate. The Trades Hall committee then decided that they would proceed with the erection of more meeting rooms, as, owing to the number of societies joining yearly, they were pressed for space in which the various committees could keep their papers and hold their weekly gatherings. The foundation stone of these new rooms was laid in 1882 by Mr. Benjamin Douglas, the first president of the Trades Hall Council. At the beginning of 1883 they were completed and opened, the cost of this new portion being $17,000. But a single year had hardly passed prosperously over the colony of Victoria before the old cry of insufficient accommodation was again raised. The committee wanted more land, and the government were petitioned for a quarter of an acre block which at this time was lying vacant. This was granted to them and a new building erected thereon. In view of the increasing value of the Trades Hall property the question of the control of these buildings was raised in the year 1885. The land had originally been vested in trustees appointed by the government which had made the grant. But as it was the trades unions which provided the funds wherewith to build, it was held that

the Trades Hall Council should have control over their own property. After some months of dispute it was agreed to refer the matter to the Minister of Lands. After due consideration it was decided that the trades unions should appoint an additional number of trustees to represent them, and that this enlarged body should act in conjunction with the Trades Hall Council. This was considered fair and satisfactory, and is still the condition under which the buildings themselves are managed. The net profit accruing from the annual eight-hour demonstration had at this time reached a large sum.

ANNUAL CELEBRATION.

On the 21st of April, 1888, it is estimated that about twenty-five thousand of the working classes took part in the procession. There is nothing like this demonstration anywhere else in the world, except, perhaps, St. Patrick's day in New York. It is recognized by the government as a public holiday. Her Majesty's representative, the Governor of Victoria, generally countenances the movement by viewing the procession from a window of the treasury buildings, and has attended the banquets given by the pioneers of the eight-hour league. It is strictly kept by all workmen, who with their wives and children repair to large pleasure gardens in the outskirts of the city, and in healthy, honest enjoyment commemorate the introduction of the eight-hour system into Victoria. No more striking example of the prosperity of the colony can be evidenced than the public rejoicing throughout the length and breadth of Victoria on the eight-hour day. It exemplifies the fact that here labor is well paid and contented. Therefore the security of property is guaranteed, and peace, prosperity, and progress are insured throughout the land. The demonstration of 1888 resulted in the funds of the Trades Hall being augmented by $6,000. It was then determined to build capacious wings to the original hall at a cost of $25,000, and these are now in course of construction, and will be completed about the end of March, 1889.

TRADES HALL COUNCIL.

The Trades Hall Council is composed of the trustees for the time being, as legally appointed by the government, but actually nominated by the trades, together with representatives of the unions who contribute to the funds of the Trades Hall. These representatives are regulated to one for every society numbering over twenty and under one hundred members; over one hundred and not exceeding two hundred, two representatives; over two hundred and not exceeding four hundred, three representatives; and over four hundred members, four representatives. Other trade societies or branches may appoint one representative in the council on payment of an annual fee, ranging, according to the number of members, from $5 to $20. The societies meeting in the hall contribute to its funds as follows: For not less than twenty nor exceeding *two* hundred financial members, 50 cents per

member per annum. For every financial member over two hundred and not exceeding four hundred, 30 cents per member per annum. For every financial member over four hundred, 15 cents per member per annum. The foregoing are the principal sources of the income of the Trades Hall, excepting the sum derived from the annual demonstration. The payment of the contributions mentioned above entitles each society to the use of such room as may be determined upon by the building committee, for one night a week.

A trade society to be recognized by the Trades Hall Council must consist of at least twenty members. It is also set out that a trade society "shall mean an association of persons engaged in one or more branches of industry or labor, formed for the protection or advancement of their interests." The following is a list of all such societies that meet at the Trades Hall, showing as near as practicable the present rates of wages. Some of the trades comprised in this list consist of three or four different societies, but it is hardly necessary to give their titles. The rates of wages are in some instances only the average earnings, as in a proportion of the trades the men are paid partly or entirely by piece-work, in which case there is no specified amount as a day's wage.

Occupation.	Wages per day.	Occupation.	Wages per day.
Agricultural-implement makers	$2.00	Glass-bottle makers	$2.08
Aerated-water makers	1.75 to $2.25	Iron-moulders (including iron-founders and friese-moulders)	2.66 to $3.00
Brick-layers	2.66	Iron-workers' assistants	1.68 to 2.50
Brick-makers	1.75 to 2.25	Laborers	1.62 to 2.00
Builders' laborers	2.00	Lithographers	2.08 to 2.25
Book-binders	2.50	Masons	2.50
Boiler-makers	2.50 to 3.00	Millers	2.08
Brush-makers	1.75 to 2.25	Malsters	2.50
Brass-founders	2.25 to 2.75	Pressers	1.75 to 2.80
Boot-makers	2.00 to 2.50	Plumbers	2.50
Blacksmiths	2.25 to 3.00	Painters	2.00 to 2.50
Brewery employés	1.75 to 2.00	Plasterers	2.50 to 3.00
Bakers	2.25	Quarrymen	2.50
Cigar-makers	1.75 to 2.25	Saddlers	1.75 to 2.80
Coach-makers	2.00 to 2.50	Seamen	1.50 to 1.75
Coopers	2.00 to 2.50	Stewards and cooks	2.00
Corporation laborers (scavengers, etc)	1.50 to 1.75	Silk hatters	2.80
Cutters and trimmers	1.80	Stevedores	2.50 to 3.00
Confectioners	1.80 to 2.25	Shipwrights	2.50 to 3.00
Carpenters	2.50	Sail-makers	1.75 to 1.90
Engineers	2.50 to 3.25	Timber-yard employés	1.50 to 2.75
Engineers, marine	2.75 to 4.00	Tinsmiths	2.08 to 2.30
Engine-drivers	2.00 to 2.50	Typographical society	2.50
Furniture-trade employés (including cabinet-makers and upholsterers)	2.25 to 2.50	Tanners, curriers, and leather-dressers	1.50 to 2.25
Felt hatters	2.00 to 2.25	Wharf laborers	2.25
Farriers	2.25 to 2.50	Wood-turners	2.00 to 2.50
Gas-stokers	2.08	Wicker-workers	1.90
		Wheelwrights	2.00 to 2.50

Of the above trades the majority work forty-eight hours a week, but the brick-layers and masons work only forty-five.

At the present time the carpenters are agitating for a reduction also of their hours to that number, and there seems to be a good chance of a successful issue to their efforts. The two great English societies of Amalgamated Engineers and Amalgamated Carpenters have branches in Victoria, and are included in the preceding list under the general heads of engineers and carpenters. The Association of Amalgamated Engineers extends all over the world and has upwards of fifty thousand members. Very few of the unions in Victoria are formed for anything but the "protection and advancement of their trade interests." But the societies of Amalgamated Engineers and Amalgamated Carpenters allow certain benefits to their members. These benefits consist of an allowance to those out of work, sick-pay, accident-pay, funeral expenses, and superannuation grants.

FEMALE LABORERS.

One of the most important attributes of the Trades Hall Council in Melbourne was developed in 1882. For nearly thirty years men in Victoria had combined together to secure the restriction of their hours of labor, and a fair maximum of payment for the same. But their sisters were no better off than in the Old World. The factories which sprang into existence after the law of protection for local industries had been enrolled upon the statute-books, employed many hundreds of young girls and women. Little by little their wages became reduced. The female operatives for a long time bore their growing poverty with heart-burnings and complaints, but without overt action. But even women will fight when the oppressive hand of capital touches their homes too harshly and too pitilessly. A strike at last took place in the establishment of Messrs. Beath, Schiess & Co, large wholesale clothing manufacturers. The price for making coats, and vests, and pants was reduced to what the girls considered a starvation minimum. They appealed to the managing partner, a prominent member of the Young Men's Christian Association, but in vain. Then three hundred girls from this and other establishments met at the Trades Hall. This action on their part showed the confidence with which all the laboring classes of Melbourne look to the Trades Hall Council to assist them, whether they are members of unions or not, to get their proper rights. That they should afterwards connect themselves with this great labor organization is, to a certain extent, insisted upon, and it is only right that it should be so. Those who lack the power which money gives are taught that in union is their only chance of obtaining equity; that in this alone lies the strength which is necessary to regulate the conflicts of wealth and labor. No time was lost in helping these girls to obtain honest remuneration for their work. The meeting in question was presided over by the author of this report, a citizen of the United States, but for

many years an Australian colonist. The result of this meeting was the formation of a Tailoresses' Union, and the adoption of a reasonable scale of prices for piece-work. An appeal was made to the trade societies and to the public to support the female operatives on strike until these satisfactory rates were agreed to by the masters. I powerfully advocated the cause of the working-girls in the columns of the Melbourne Age. Public sympathy soon showed itself in the form of subscriptions to that journal, and the fight was maintained until the tailoresses gained their point. Since that time the female operatives have done well. They have now a male secretary and are represented in the Trades Hall Council. In 1886 the trustees decided to erect a hall especially for them. This was done at a cost of $9,250, and is now known as the Female Operatives' Hall. The societies in connection with this hall consist of the Tailoresses' Union and the Associated Female Operatives. An attempt was also made in connection with this hall to form a Domestic Servants' Union, but owing to the very half-hearted manner in which it was taken up by the servants themselves, and to the strenuous opposition of the labor and registry officers, nearly all of whom refused to engage servants belonging to the union, the attempt fell through. The health of women is a far more vital question, as affecting their earnings, than is the case with men. It is therefore highly important that women should share in the benefits of labor organization, not only for their own sakes in their own living, but for the sake of the nation which these female operatives will help to build up. Nothing can be so detrimental to the best interests of Victoria, in common with all countries, as the imposition of long hours and poor wages on working-women and working-girls. A young girl who spends the best part of her life within the walls of a factory, and taxes her strength to the utmost, is unfitted to become a mother of healthy children. The promoters of and sympathizers with the Female Operatives' Association conferred a benefit not only upon the working girls, but upon the whole colony of Victoria in its future generations of working-men.

Social reunions, which, apart from their direct entertainment, do a large amount of good in creating an *esprît de corps*, are successfully held by the girls in their own hall.

APPRENTICES.

Another general question to which the labor organizations are giving their attention at this time is that of apprenticeship. In the old English "guilds" it was the custom to limit the number of apprentices to be taken by each employer, who was in those days himself a master workman. This custom has been followed by the English trades unions, which are in fact but the outcome of the old guilds. It is being taken up by the labor organizations of Victoria with the intention of regulating the number of apprentices to journeymen operatives. Considerable dissatisfaction at present exists amongst the workmen in some

trades at the present practice of unlimited apprenticing. In order that the inquiry should be as comprehensive as possible a schedule of questions has been prepared by the Trades Hall Council, a copy of which is sent to every society in Victoria with a request that they should each give replies thereto and offer any practical suggestions or remarks on the subject.

MINERS' ASSOCIATION.

Outside of the metropolis labor organizations exist throughout Victoria in proportion to the population of different centers. The most powerful is the Amalgamated Miners' Association of Australia, whose headquarters are at the important gold-mining township of Creswick. This association extends over the whole of the Australasian colonies and includes all miners, whether working for gold, tin, or coal. It consists of forty-two branches, having the following number of members:

Colony.	Branches.	Members.
Victoria	31	7,657
New South Wales	3	4,502
Queensland	4	1,842
Tasmania	2	145
New Zealand	2	551
Total	42	14,697

The New South Wales branches include fifteen lodges of coal miners in Newcastle, by far the most important coal district in the colonies. This is the largest branch of the association, having a roll of four thousand one hundred members. The funds in hand on the 30th of June, 1888, amounted to no less than $98,235, and during the year ending on that date the association paid total benefits of $62,950. These benefits included $30,155 to members for accident-pay, $9,510, for death allowance, and $16,450 for strike-pay, out of which $15,350 was to the Newcastle coal miners in their late protracted struggle.

The donations made to charities during the year by the association reach the sum of $6,850. But the disbursing of their funds is not the only or by any means the principal business of the association. In the last annual report we read: "That while attaching due importance to the accident benefits, members should not forget that the provision in case of accidents is not the primary object of our existence, but rather the maintenance of the rights and priveliges pertaining and belonging to our occupation." There is no doubt that the association has accomplished a great deal for the working miners of Australia. It has secured for them shorter hours and higher wages. Greater safety to life and limb has also been insured in the working of mines, and in every way it has bettered the condition, not only of members, but of the whole mining community. A matter which has received the atten-

tion of the association during the past year is what is known as the "non-members question." On this subject the president remarks:

The rule that members will not work with non-members appears necessary in the present position of trades unionism. It is, nevertheless, a rule that requires very careful and delicate manipulation, and in my opinion in the near future will be found unnecessary; but while the right of men to work or decline to work under any given condition is undeniable, they should always be careful to concede the same rights to those who are opposed to them. Thus, if members of any labor organization decline to work with those who are not members, it then becomes a question affecting the interests of the employers, who have to consider whether it is most conducive to their interest to retain the services of the unionists or non-unionists. If the employers decide to retain the latter, it is the duty of all true unionists to accept the decision gracefully, and to be careful to use only the legitimate means of moral suasion to gain the object they have made their choice, and they should abide by the result. I firmly believe that if all unionists would take this moderate view of the question, there would be less trouble between employers and employed.

According to this temperately expressed view of the chief of the most powerful labor organization in Australia, the great aim of all unionists should then be to make themselves indispensable to their employers. They should do this by performing their duties thoroughly, and by endeavoring to excel at their trade. The best workmen could then easily convince their fellow-craftsmen of the necessity of banding themselves together in societies for their own protection, and thus leave so small a minority of non-unionists that it would be impossible for any employer to carry on his work with the few men at his disposal. The great law of republican democracy, that majorities must rule, and the few must submit for the benefit of the many, will first have to be thoroughly realized by every individual working-man before universal unionism is an accomplished fact. Then, in the words of the president of the Miners Association, "the necessity for protective labor organization will no longer exist, right principles will govern the actions of capitalists and workmen, and 'man to man the wide world o'er shall brithers be for a' that.'" But so long as selfishness and greed exist, so long will unionism be necessary to secure to the working classes the just fruits of their toil.

CHINESE.

One matter of great interest to miners in particular, as well as to the other trades of Victoria, was settled to a great extent during 1888. This is with regard to the influx of Chinese. In Australia, as on the Pacific slope, in the United States, the Mongolian immigrant is little more than a toiling automaton, able to subsist upon the lowest diet, and possessed of an inherent grossness that wishes for no better habitation than the merest hovel which will afford shelter and room to sleep. To compete with such a class would necessitate the Victorian working-men being reduced to its level, for it appears impossible to raise Chinese to a white man's standard. The Miners' Association, as represented by their delegate in the Trades Hall Council, joined in a

deputation that in the spring of last year waited on the premier of Victoria to urge the necessity of preventing a great influx of the Chinese. The government adopted prompt measures to avert what at one time threatened to be a large immigration of these undesirable colonists. As a consequence of this the difficulty was overcome far more easily than might have been anticipated. It was owing to the initiative taken by the labor organizations that a conference of members of the different Australian governments was held, and it resulted in a determination to introduce almost prohibitive legislation against the introduction of Chinese.

MISCELLANEOUS ORGANIZATIONS.

The next important center of labor organization to those already mentioned is at Ballarat, the second largest city in Victoria, 100 miles from Melbourne, and containing about 40,000 inhabitants. Here the working-men have a trades hall on the same lines as at Melbourne, but the number of different labor societies is comparatively small. The principal union is that known as the "Eight-Hour League," similar to the one in the metropolis. This league has a representative in the Melbourne Trades Hall Council, which in return nominates a delegate at Ballarat. The same system prevails at Geelong with regard to the "Eight-Hour League." This town has the honor of being the first in Victoria to establish a woolen mill. There are now four of these manufactories in Geelong, which can employ nearly a thousand operatives. But the only trade which has a union of its own in this town is that of the tanners and curriers. The majority of mill operatives, and also of other trades, find at present that their interests are sufficiently maintained by the efforts of the "Eight-Hour League." The towns of Horsham, Lale, and Echuca are also centers of the above league. In Echuca a large trade is carried on in native red-gum timber. There are now five large red-gum saw-mills in the town, and in addition to the "Eight-Hour League," there is a well-supported saw-millers' society. An important organization, which is not at present affiliated with the Trades Hall, is that of the railway employés. This consists of over ten thousand members, and in addition to being a trade society secures also certain benefits to those joining it. Amongst these the idea has been mooted of the necessity of associating themselves with the other unions, and in time this will no doubt be accomplished.

DISPUTES AND STRIKES.

It is necessary to refer only briefly to the disputes which have taken place during the past few years between the masters and men of the different trades. The most important of these was the boot-makers' strike in the year 1884. The object of the men in this case was the abolition of what is known all over the world as the system of "sweating," which had grown to considerable proportions. Efforts were made

to have the dispute settled by a board elected from the Trades Hall Council, but the employers refused to abide by its decision. The men remained out on strike for thirteen weeks, during which time they were well supported by the other trades societies. Contributions were received which permitted of strike-pay being allowed for the whole of the thirteen weeks at the rate of $6.25 per week for the married men and $4.50 to the single men. At the end of that time a compromise was effected, but there is still a great deal of dissatisfaction existing, and in the near future the struggle will doubtless be revived.

The next serious dispute was towards the end of 1886, when the wharf laborers demanded certain increases in the rates of wages. These not being granted, the men struck work on the 1st of January, 1887. The ship-owners at once endeavored to obtain laborers from the other colonies, and to some extent succeeded. Many of the imported men, however, were of the lowest class, and not a few actually old convicts. Upon this the Seamen's Union gave notice that unless this action was discontinued they would withdraw every unionist in the ships. But in spite of this threat the ship-owners persisted in their operations. The Cooks and Stewards' Union then decided to instruct their members to leave the ships. At the same time the marine engineers refused to employ any firemen not having a certificate of discharge, in which case none of the imported men would have been allowed to work in that capacity on board a ship. The masters thereupon agreed to refer the dispute to an independent board of ten members, each side to nominate five. Had the masters not consented to this, two thousand men employed on the local steamers would have gone out on strike, and the coasting trade would have been paralyzed. The decision of the board practically gave the men all they wanted.

The next dispute arose in the iron trade, owing to the men in one of the largest shops in Melbourne demanding the dismissal of a non-unionist. This was more on account of a dislike to the man himself, who, apart from refusing to join their society, was looked upon as a spy. The employers threatened to lock out all unionists unless they consented to work with this objectionable individual. The iron-molders' assistants were locked out for a week, when it was decided that they should return to work and the matter should be referred to an independent board. There was, however, considerable delay in the appointment of the board, and in the mean time the obnoxious individual left the colonies and the quarrel lapsed into oblivion.

During 1888 there were two efforts on the part of the working-men of Victoria to increase their wages. The first was by the Typographical Society, but as two or three of the largest firms allowed the demands no strike took place, and the smaller employers at once followed the example of the others. The second demand was from the iron-molders for the increase of the minimum day's wage from $2.50 to $2.75. In this case the men were out on strike for eighteen weeks, at the end of

which time the dispute was practically settled in their favor. Each side stated its case to an independent arbitrator, who gave a two-thirds award to the men by fixing the minimum day's pay at $2.66.

A small technical dispute between the tinsmiths and a single employer in Melbourne resulted in the formation of a permanent Board of Conciliation. The objects of this board are to investigate disputes between employers and employés, and to recommend such terms of adjustment as may seem to be fair and reasonable. The board consists of eighteen members, nine of whom are appointed by the Trades Hall Council and nine by the executive of the Victorian Employers' Union, a body which has of late years been formed for the protection of the capitalists' interests. The following are some of the most important regulations incidental to the constitution of this Board of Conciliation:

No alteration shall be demanded by either employers or employés in the hours of work, the rate of wages, or system or conditions of working, except after two months' notice by the person or persons desiring such alteration to the person or persons with whom such alteration is desired to be effected. Before any strike or lock-out shall be resorted to, the matter in dispute must be referred to the secretaries of the Trades Hall Council and the Victorian Employers' Union, respectively. If they fail to secure a settlement the dispute is then to be referred to a committee of inquiry, consisting of two members from the Trades Hall Council and two members from the Employers' Union executive. If these also fail to arrange a satisfactory settlement, the Board of Conciliation, having the power to examine witnesses on oath, shall adjudicate upon the matter, and their decision shall be considered final, and a strike or lock-out only be deemed justifiable when the non-recognition of their decision is certified to in writing by the committee of inquiry. In the event of a strike or lock-out being resorted to by any body having subscribed to the rules of the Board of Conciliation before the preceding events have taken place, every other organization shall be bound to refuse all sympathy and support in this independent action.

The working of this board has not yet been thoroughly tested, and the larger labor organizations are holding aloof from the movement until they gain some experience of its results upon the smaller societies which have given their adhesion thereto.

LABOR REPRESENTATIVES IN PARLIAMENT.

The labor organizations have not at the present time any representatives in the Victorian Parliament. At the last general election three labor candidates were defeated in metropolitan districts. The line of demarkation between the bread-winner and the money-spinner is not drawn here as in Europe and the United States. In the early days of the colony, before members received their present pay of $1,500 a year, many members of Parliament acted as delegates for mining constituencies, being supported as several members of the English Parliament now are, by an annual subscription of the electors. The present Premier of Victoria, the Hon. Duncan Gillies, represented Ballarat as a working miner, and was for a time paid by his supporters, whose mouth-piece he was. Amongst the eighty-six members of the present legislative assembly there are many men who were originally in the ranks of labor,

and who, like Mr. Gillies, have since occupied positions as ministers of the Crown. Mr. Langridge, who represents an important district of Melbourne, was a practical stone-mason and a member of a trades union. He has now acquired great wealth, but always boasts of his connection with labor organization. There are also in Parliament a slaughterman, a printer, a market-gardener (who is the leader of the present opposition party), an engine fitter, a working jeweler, and a tailor, besides men who in their early days, like many other successful ones in this colony, have worked in the gold mines.

But labor representatives pure and simple have found little favor in Victoria, the opinion of the mass of the electors who control the colony being that they do not require any special representatives of this kind. It will be seen that the needs and wishes of the laboring classes have been recognized by the various governments of Victoria in grants of land to the trade societies and in the recognition of the principle that eight hours constitute a fair day's work. Members of the Trades Hall Council are always included in the management of national undertakings. This is exemplified at the present time by the appearance amongst the names of the Executive Committee of the Centennial International Exhibition of that of Mr. Trenwith, a prominent member of the Trades Hall Council, a practical boot-maker by trade, and the organizer of the late strike.

WORKING-MEN'S COLLEGE.

The Working-Men's College in Melbourne is recognized by the government, which was induced to grant land on which to erect the building. It was founded in 1887 by the Hon. Francis Ormond, a well-known, public-spirited philanthropist, who initiated public subscription by a gift of $25,000. Not only has this institution been thoroughly well established, but it is progressing most successfully, as the following tables will show:

Attendance.

Items.	1887.		1888.		
	Second term.	Third term.	First term.	Second term.	Third term.
Total enrollments	646	985	1,530	1,953	1,819
Number of females	12	52	164	271	241
Number of juniors (under eighteen and apprentices under twenty-one)	275	414	592	739	681
Number of classes	23	37	53	69	74
Number of instructors	13	19	24	30	29

Class of students attending.

Class.	1887.	1888.		
	Third term.	First term.	Second term.	Third term.
Skilled laborers or artisans	583	731	979	91
Clerks, teachers, and draughtsmen	175	421	503	44
School, domestic, and occupations not given	109	205	261	25
Shop employés	91	128	143	12
Unskilled laborers	27	45	67	7

Ages of students attending.

Age.	1887.	1888.		
	Third term.	First term.	Second term.	Third term.
Fourteen years to sixteen	84	148	251	265
Sixteen years to twenty-one	493	734	947	802
Twenty-one years to thirty	271	506	593	625
Over thirty	57	93	143	99
Not stated	102	49	19	28

There is no doubt that this college, although it trains but a compar
atively small number of workmen, will do a large amount of good. With the better education of the laboring classes must come a desire to improve their material condition. The leaders of labor organization pretend that there is only one way of accomplishing this. In his well-known book on "Strikes," Sir Rupert Kettle, the English judge, says with regard to trades unions:

> They have promoted free thought and free action among the hard-working classes, and, moreover, have taught them to respect the law and rely upon moral means for what they believe to be right. We have now no bloodshed, no rioting, scarcely an angry word in the bitterest and most protracted strikes. Although we owe this salutary change partly to the improved education and the higher moral tone among the work-ing classes, we owe it much more to the direct and immediate influence of trades unionism.

A well-known writer on the laboring classes of England and America remarks that "trades unions have increased the price and short-ened the hours of labor; have educated working-men to a knowledge of their common interest and common duty, and in every sense have raised the character of English workmen." If these things can be accomplished in England, where trades unions have had to fight against the laws and customs of a country once under the feudal system, the traces of which exist even to the present day, how much more may be done under the glorious Australian sun, which sheds its light upon a land, perhaps the only one on earth, where neither the gross despotism of wealthy classes nor the footprint of a single slave has ever been known. In this new

world labor started under new conditions, and without the depressing mildew of custom, which is stronger almost than law in the older nations. The pioneers of Victoria were of the sinews of the earth; the salt of the world. They have left their impress upon all Victorian society, and upon labor organization, which in consequence is of a higher rank than elsewhere.

In Australia, as in Europe, periodical congresses of the trades societies are held. So far Australian labor organizations have not shown any desire to be represented outside their own borders, and indeed they have little to gain by associating themselves with European labor congresses. Until English working-men have raised their condition to that of their Austalian confrères, and those on the Continent have advanced to a higher stage, it is considered that Australians, like Americans, must take measures so that their country shall not be overrun by cheap foreign European or Chinese labor.

MELBOURNE, *January* 10, 1889.

REPORT ON INLAND NAVIGATION.

By Assistant Commissioner THOMAS B. MERRY.

MELBOURNE, *November* 1, 1888.

SIR: The wealth of any nation necessarily depends upon two things: first, its ability to produce articles of food, and, second, its facilities for getting such products to market. Man must eat to live, and he cannot eat gold or precious stones. All mines, whether of the precious metals or of those devoted to ruder usages, such as coal, copper, iron, zinc, and nickel, are liable to be exhausted and never replenished, while a good soil can be made, by judicious rotation of crops, a richer property than any mine of gold or even diamonds. Gold and silver mining must be classed to a certain extent as vicious avocations, for the reason that those following them are usually nomadic in custom, dissipated and prodigal of habit, and never identified with that slow and sure development which has marked the progress of the Anglo-Saxon race.

No more striking exemplification of this could be had or is needed than the history of the three Pacific States, California, Oregon, and Nevada. So long as alluvial gold-diggings enabled the nomadic placer-miner to tramp from gulch to gulch with his entire belongings upon his back, to live in a semi-barbaric condition in a rude hut, and to squander the surplus of his earnings in gambling and other riotous amusements, just so long the States of Oregon and California were in an impoverished condition and bore no part in the advancement of American ideas. The history of Nevada is still more pitiable, for she has no agricultural resources upon which to fall back, as California and Oregon have done and now finds her vast quartz ledges exhausted, after having yielded nearly six times as much gold and silver as Oregon.

The advancement of California and Oregon dates practically from the exhaustion of placer-mining and the enrollment of the people of those two young States among the great and progressive army of permanent home builders. In 1850 the city of San José, in California, was the capital of the State, and its fourth largest town. In 1856 it had subsided to the ninth in order of population, and was wholly devoid of local wealth. In 1887 it was the fourth city of the State, owing to the manner in which fruit-preserving industries have been estab-

lished there, thus affording a home market to the farmers and fruit-growers of all that rich and beautiful region—the Santa Clara Valley. In the same way the city of Portland, in Oregon, only a small and ill-looking river town during the days of placer-mining in that State, has grown, through her grain exports to the United Kingdom and her traffic in preserved fruits with the extreme Northern States, into a metropolitan city of graceful proportions, with commercial edifices fit for cities of ten times her population. It, therefore, stands to reason that the greatest wealth must be hereafter found in the food-producing States of the Federal Union rather than those which yield only metallic products, subject to indefinite exhaustion.

Australia, while I believe it to be by far the greatest producer of precious metals in the known world, is also a great food producer, and has recognized sources of material wealth outside her vast quartz reefs and deposits of tin and coal. Undoubtedly inferior in quantity of grain per acre, not only to California and Oregon, but to Washington and Dakota as well, she produces a quality of wheat so far superior to all grain grown in America that it is eagerly sought after for seed in all our Western States and Territories. As a producer of beef and mutton Australia leads the world, employing, as she does, four of the largest lines of steam-ships in the world to carry her meat products, in refrigerators, or cold-storage compartments, as they are called in the colonies, to the European markets. No one who has kept watch of these exports, as the writer has done during his six months' sojourn in the colonies, can be unmindful of the great producing power of the southern continent—a power that must be perceptibly increased whenever an intelligent and comprehensive system of irrigation is put in motion, having for its object the greatest of good to the greatest in number. And being thoroughly satisfied of Australia's capacity as a food-producing nation, let us see what are her chances for getting her food products to the world's greatest highway—the ocean.

MURRAY RIVER.

The Murray River, having its source in the mountains of New South Wales, sometimes called the "Australian Alps," is the largest of all the Australasian rivers, and is the only one which has a fairly defined current by which an experienced American pilot, thoroughly skilled in his vocation upon the grand rivers of our own continent, would be able to go on board an Australian steamer and pick his way along the turgid and swollen stream; for it is only during the season of freshets, arising from melted snow, that even the Murray River, sometimes called the "Mississippi of Australia," is navigable at all. These mountains are so much lower than the Sierra Nevadas, in California, which furnish the navigable waters of the San Joaquin and Sacramento; the Cascade Range, of Oregon, out of which the Willamette and Columbia derive their navigation, as well as the Skagit, in Washington, and the Fraser

in the province of British Columbia, that once the snow becomes fairly melted away the navigation abruptly ceases until the opening of the ensuing year. The Murray is navigable from its mouth, in South Australia, to Albury, in New South Wales, a distance of 1,468 miles by the bends of the river. It is so tortuous in its course that railway communication has reduced it nearly 58 per cent. Not far below Echuca, which is now to all intents and purposes the practical head of navigation, I measured a bend of the river which is 23 miles across and $52\frac{7}{10}$ miles around it, upon the official map of New South Wales; and another which was $8\frac{1}{2}$ miles across and $20\frac{3}{10}$ miles around. The Snake River, in Idaho, and the San Joaquin, in California, are the most sinuous of all American rivers, and yet they fade into utter insignificance in this respect beside the Murray. Fortunate, however, it is and has been in the years that have gone by, that the channels of the alleged "Mississippi of Australia" are so tortuous, for if they were as straight and well defined as those of the Sacramento, in California, or the Willamette, in Oregon, there would be too rapid an escape for the melting snows, and the river would be navigable for a less period than three months in the year. As it is, the greatest efforts on the part of the local governments of New South Wales and Victoria have been necessary to keep it open by the removal of snags in the current as well as limbs of overhanging trees, which would throw a smoke-stack down upon deck or sweep away a portion of the deck load of a barge while swinging around a tortuous bend.

As on the Upper Sacramento in California, the hulls of the boats are not decked over, and the cargo is carried upon barges, which are towed astern from a "king post" in the center of the boat's hull by a hawser 5 inches in circumference, and paid out from 180 to 320 feet, according to the quantity of water in the river; but on all the California rivers no barges are towed in high water, as the boats are enabled, by the insertion of temporary decks over their open holds, to carry from 180 to 300 tons of cargo upon their own hulls. The boats on the Murray, however, are entirely too small to bring about such results. Most of these Murray boats are not exceeding 70 feet in length, with a breadth of from 18 to 20 feet, and a depth of hold which varies from 6 to 9 feet.

A far narrower river, and quite as tortuous for a distance of a least 30 miles, is the Feather River, in California, the chief tributary of the Sacramento, which rises in the Sierra Nevada range and empties into the Sacramento at the little village of Vernon, in Sutter County. It is navigable for about ten months in the year from its mouth to the city of Marysville, a distance of 48 miles. And yet there is not a steamer employed on the Feather River which could not carry three times as much as the *Trafalgar*, the largest boat employed upon the Murray; and not a barge employed upon the Feather which could not carry more cargo upon a draught of 20 inches of water than the most buoyant barge upon the Murray could carry upon a draught of 4 feet, to say nothing of

being better equipped for the comfort of the bargemen, and in every way better adapted to rapid handling in a piece of crooked or dangerous water.

STEAMERS.

On the Murray River and its tributaries are employed not less than eighty of these small steamers, to do the work of which would only require about twenty such boats as ply upon the Feather River aforesaid. This would save the wages of about sixty engineers and as many stokers, although the number of pilots and roustabouts would be about the same. It would also save the wages of at least sixty cooks and stewards, and as many clerks, or pursers, as they are termed by courtesy. In the mean time the work would be better done, as larger boats would enable the trade to carry passengers in more comfort, at a greater rate of speed, and in an equal degree of safety, wherever competent pilots are employed. Nearly all the pilots on the Murray River are either men born right there, and never educated up to river work in other countries, or else men whose entire lives had been spent in deep-water ships upon long voyages across the ocean highways. Of course, neither of these two classes could rise to a belief that the strictly American profession of a river steam-boatman is a distinct calling by itself, as widely separate from maritime navigation as theology is from medicine, or civil engineering from the common law. The *Trafalgar*, however, I found to be officered by as pleasant and genial-mannered a lot of men as it was ever my good fortune to meet, and my two days on board of her served to teach me that nothing could surpass the hearty hospitality of Australian river-men. At the same time a sense of candor compels me to assert that they are at least fifty years behind the steam-boatmen of the United States in the general details of steam-boat work. This is especially true of low-water work. Not one of them had any ideas of how to get a boat off a bar, except by running a line to a tree on the opposite side of the river and dragging her off backwards. The use of the spar-derrick and the steam-capstan, by which alone the Upper Sacramento was preserved as a navigable stream from 1857 to 1870, was to them a mystery as deep as the origin of Edison's phonograph. The idea of lifting a boat bodily over one sand-bar only to encounter another at a half mile further up stream, seemed to them a history of steam-boating under difficulties, and yet they were amazed when I told them it had been the history of navigation of the Ohio, Wabash, Sacramento, Colorado, Willamette, and a dozen other large American rivers during the past half century.

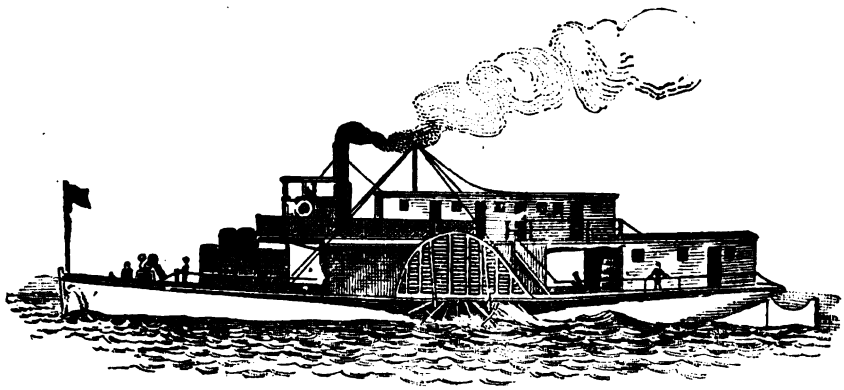
"You fellows are a nation of Edisons and Westinghouses," said the captain of the *Trafalgar* as I showed him the process of working a boat over a bar by the use of a steam-capstan and a spar-derrick; "you never meet an obstacle but your natural powers of invention give you the means to overcome it."

I told him that a man who went away from home with the idea that

he knew everything would be very apt to return without learning anything, and that I had already seen something to instruct me as well as several things to amuse me.

"No doubt you are amused at our primitive methods of steam-boating," said he, "but where do you find anything calculated to instruct?"

I showed him the machinery of the boat, which I calculated to be about 60 horse-power and the most compact I had ever seen on any boat of her size. The boiler was a marine pattern wholly unlike anything in use on American river boats and having nine return-flues. Directly over it, upon an iron arched bed-plate, rested the engines, a pair of non-condensing engines of 14 inches diameter of cylinder by 40 inches stroke of piston. The fuel used was the red-gum and boxwood of the forests, and the consumption was less than five-eighths of a cord per hour, carrying 85 pounds of steam to the square inch, and cutting off at five-eighths of the entire stroke. The *Trafalgar* was not much for beauty, but a good business boat, and every inch of her space well utilized. The following is a sketch of that vessel:



She was built at Echuca in 1884, and is 98 feet length over all, 18½ feet beam, and 7 feet depth of hold. The hull is of the composite order, being a wooden bottom of red-gum with kelsons and garboard streaks of the same material. Above these the sides are of iron plate, with all her beams and moulding timbers of the same material. The iron work of the hull, as well as the engines, was done at one of the Melbourne foundries. She has a stiff shaft, that is, her engines are not disconnected so as to admit of going ahead on one and backing the other, as is the case with all the boats on the Ohio and Mississippi Rivers. Nevertheless, she made all the bends very cleverly with her barge in tow, but it is to be remembered that the river was 11 feet over low-water mark, or summer level, as they call it in Australian parlance. The pilot-house is all open on the sides instead of being inclosed in glass, like our American boats, but here was a reversing-bar and a throttle, so that the pilot could slow, stop, or back the boat just as he desired without sending down a bell to the engine-room. I deemed this a very creditable auxiliary to the boat's appliances.

The speed of the *Trafalgar* down stream, with her barge in tow, was a trifle in excess of 6 miles per hour; and her draught, with no cargo whatever in her hull, was 46 inches. On any river in California, Oregon, or Washington, could be found boats capable of carrying 200 or 220 tons of cargo upon the same draught of water and making from 10 to 12 miles per hour, without additional help required in towing a barge. I append a table of distances on the Murray River. The portion of the river lying between Echuca and Albury is 301½ miles in length, but can only be navigated about two months in each year; and as Albury lies on the Grand Trunk Railway line between Sydney and Melbourne, just about as far distant from the latter city as is Echuca, it will readily be seen that there is not any profit in carrying produce down the river from Albury to Echuca and thence by rail into Melbourne. The Darling River joins the Murray at Wentworth, hence these tables have been compiled above and below that point.

Echuca and Albury to Wentworth.

Places.	Echuca.	Albury.	Places.	Echuca.	Albury.
	Miles.	*Miles.*		*Miles.*	*Miles.*
Echuca	0	301½	Windomal	277	572½
Wharparilla	4	305½	Narong	284	585½
Dead Horse Point	23½	325	Riley's Hotel	292	593
Perricoota	38	330½	Murrumbidgee	294½	596
Toorannabby	55½	357	Meilman	336½	638
Thule Creek	89½	391	Euston	369½	671½
Clump Bend	117	418	Gell's Island	396	697½
Campbell's Island	125	426½	Ki	418½	720
Gunnawarra Huts	135½	437½	Kulkyne	436½	738
Gonn	141½	443	Brett's	439½	741
Pental Island	158	459	Woolshed	442	743½
Woods	171½	473	Tapalin	448	749
Murray Downs	189½	491	Island	454½	756
Swan Hill	192	493½	Cowarp Hut	471½	773
Beveridge Island	204½	506	Mallee Cliffs	482½	784
Tyntynder	212	513½	Macfarlane's Reef	488½	790
Nyah	222	523½	Macfarlane's	496	797
Tooley	229½	531	Gol Gol Creek	511½	813
Pianghill	240	541½	Mildura	517	818
Tooleybuc	244½	546	Cowana	537½	839
Bitch and Pups	255	556½	Williams'	539	840
Wakool	266½	568	Junction (Wentworth)	549½	851

Goolwa to Wentworth.

	Miles.		Miles.
Goolwa.		Hart's Island	274
Point Pomond	35	Wigley Flat	309
Wellington	41	Overland Corner	311
Cook's	43	Cobdogla	324
Mason Rocks	55	Pyup	345
Thompson's Rock	63	Paringa	402
Wall	88	Murthoo	444
Dumas	93	Chowilla	451
Mannum	95	Isle of Man Creek	466
Taylor's	109	River Lindsay Junction	483
Smith's	131	Watminga	552
Chambers'	135	Whambaloo Island	566
Luscombe's	169	Crozier's Rocks	567
Moorunda	189	Moorna	583
Blanchetown	196	Ana Branch	598
Murbko	209	Neilpo	610
Northwest Bend (Morgan)	229	Wentworth	617

It is, therefore, to be seen that the Murray River is navigable in high water for a total distance of 1,468 miles, of which 617 miles are below its junction with the Darling. When we reflect that boats of 1,250 tons have run on the Sacramento in days gone by, and that river is navigable for less than 325 miles; that the Willamette, a river capable of carrying a much larger class of boats than the Murray, is only navigable for a distance of 242 miles, we are lost in wonder that no one has adopted American boats and navigating appliances upon the "Mississippi of Australia." And yet the total distance from Albury to Goolwa cannot be by air line over 620 miles. Hence as the various lines of colonial road are tapping the Murray at various points, I can see no great future for river steam-boating in these Australian waters; nor would I recommend any American to come out here and educate these good but slow-motioned people up to the principles of light-draught steam-boating.

THE TRIBUTARIES OF THE MURRAY RIVER.

The Murrumbidgee is a tributary of the Murray, whose waters are wholly within the colony of New South Wales. It rises in higher mountains than the sources of the Murray; and hence, though a smaller river, it keeps its navigable depth of water for a much later period in the season. It enters the Murray 294 miles below Echuca, the head of easy and practical navigation, and 596 miles below Albury. The same-sized boats and barges are used to navigate it as on the Murray; and often it can be ascended for a distance of 320 miles when the Murray is not navigable above Narong. Boats have ascended the Murrumbidgee in high water a total distance of 582 miles from its mouth.

The Darling River, which enters the Murray at Wentworth, rises away up in the mountains of Queensland and flows southward and westerly. It is navigable in high water a distance of not less than 1,240 miles, not including its chief tributary, the Barwan, which is navi-

gable nearly 200 miles in high water. Unfortunately for the good people along those rivers, there has been no fall of snow for two years, and, consequently, no high water to enable the wool-growers and grain producers to get their wool and cereals to market. The spring months in Australia are September, October, and November, during which the highest water prevails. But no spring-tide has sufficed to furnish the requisite water for carrying the produce along those rivers down to the sea; and both of those streams were wholly dry during January and February of the current year. In 1887, just about the close of the boating season, the little steamer *Barwan* ascended the stream which bears her name, with a barge-load of merchandise which she discharged at a warehouse where nearly 3,000 bales of wool (averaging 420 pounds each) were awaiting her. She took on 1,400 bales upon her barge and started down stream. The river was falling rapidly and she finally got her barge aground some 40 miles from the junction of the Barwan with the Darling. As the boat was drawing less water than the barge, she attempted to lighten her over the bars but failed. The boat got out all right, but the barge and her cargo are still awaiting a "rise" in the river to enable them to get to market after a delay of two years. I am credibly informed that there are 6,400 tons of wool on the Darling and 4,200 more on the Barwan awaiting transportation to market; and that the wool-brokers of Melbourne and Sydney have ceased making cash advances upon wool grown in that section, except it first be received at tide-water.

Between the Murrumbidgee and the Murray lies the great delta known as the Riverina, which is the wealthiest portion of Australia. It has never yet failed to get its crops down to market, which I regard as the chief factor in its present condition of opulence. It, therefore, seems to me imperative that Australia should abandon inland navigation, as the Murray River and its tributaries have already proven insufficient to meet the requirements of the country with its present population; and as Australia is rapidly increasing, both by natural causes and by immigration, in wealth and population, it must be evident that a more permanent and reliable means of transportation than by the river must be devised. These rivers, in which annually millions of gallons of unemployed and useless water are carried to the sea without contributing anything to the wealth of the country, should be utilized for purposes of irrigation upon a scale grander than anything so far devised in Europe or America; and that the transportation of staple products to tide-water must hereafter be performed by the colonial system of railways. Irrigation will so far increase these products that there is no probability that the railways will ever lack a supply of traffic.

Very respectfully,

THOMAS B. MERRY,
Assistant U. S. Commissioner.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON MINES.

By Assistant Commissioner THOMAS B. MERRY.

SOUTH YARRA, *December* 5, 1888.

SIR: When Hargraves, who had been in California in 1850, startled the world with the statement of equally valuable discoveries upon the great southern continent, there were but few believers in the story that a new El Dorado had been found which would prove more enduring in its output of precious metals than the territory ceded from Mexico to the United States by the memorable treaty of Guadalupe Hidalgo. But such is now proven to be the case, in spite of all doubts to the contrary, for gold is the second in value of Australia's products, wool being the first; while in the Golden State of America it has already fallen behind wheat, wool, and wine. Of course California had one advantage over Australia—abundance of water for gold-washing purposes, while the alluvial gold fields of Australia, in many instances, lay idle for want of water, and in many instances, from this same cause, there were large and valuable discoveries made, but suffered to go unworked altogether. Hence it requires no deep research to perceive why Australia should head the front rank of gold producers, while California has dropped back behind Montana and Colorado in the output of precious metals. This is likely to be the case for many years to come, as California and Oregon, being more prosperous now than in the days of a commerce based upon the discoveries of auriferous river channels, have turned their attention to other pursuits, while Australia keeps on in her tireless search for gold, not seeming to realize that a civilization based upon gold mining is least satisfactory of all, for the simple reason that its votaries are visionary as a class, and nomadic in their habits, adding nothing to the material wealth of any country they may inhabit, and squandering all their earnings in idle dissipation during their hours of leisure. From 1850 to 1852 California, with less than 250,000 population, squandered over $20,000,000 in saloons and gambling houses, for no other cause than the abundance of crude gold. Hence, while admitting the yield of gold in Australia to be nearly five times as high as that of California, it is hardly a cause for congratulation, as it really marks no genuine progress towards permanent settlement or a ripened civilization.

EARLY MINING IN AUSTRALIA.

And yet, to the cultured geologist, familiar at all times with the "Testimony of the Rocks," as well as to the practical though unlettered gold digger, Australia affords more food for study and research than any other portion of the civilized globe. In California the richest of all "placers" or alluvial mining grounds had no subsequent value as deep gold fields, while the comparatively poor fields at first have been the great quartz matrices by which alone the gold product of California has been kept from dwindling into absolute insignificance. In Australia, however, a different condition of things at once confronts the beholder, as the cities of Ballarat and Sandhurst (Bendigo), which were the largest camps in the old days of alluvial mining, are to-day the greatest and most populous gold-mining cities on the southern continent, as well as the largest producers of auriferous quartz, both in value of bullion reduced and the weight of rock lifted by the newest appliances of labor-saving machinery from the bowels of the earth. Of course there is much to be said in praise of that stubborn British perseverance which leads men to drill down 2,000 feet through barren rock till an ore-body is struck upon. But it is without parallel in the world's history for the same localities which have been so rich in alluvial gold diggings to develop in a later period such unparalleled richness in the rock which is the mother of the precious nuggets that were found in the creek beds nearly forty years ago. A very correct exposition of this is to be found in a hill about 2 miles south and west of Sandhurst, first known as Bendigo. The owner of the property, Mr. George Lansell, who had a great run of luck during the alluvial-mining era, conceived the idea that a "saddle-reef" of auriferous quartz underlay the ground from which he had washed the gravel which made his earlier fortune; and, no sooner said than done, he set himself to work to find the lead, if he had to drive through the world for it and come out in France or Spain. The Johnson's Reef concern had struck paying quartz at 482 feet, and the Garden Gully Company at 564 feet, both lying to the northward of him. Lansell purchased the finest machinery that money could buy and started upon his long and toilsome search. At 564 feet, the depth of the Garden Gully lead, he was in hard and barren soil, with no evidences of quartz in sight. At 612 feet he struck so large a body of water that his pumps could not keep the shaft free, and he was obliged to cut a tunnel at right angles to carry it away into a gulch near at hand. At 1,000 feet he was still laboring in an apparently hopeless quest of ore, but his British obstinacy still kept him pegging away. Over two years had elapsed, and every Saturday night saw a pay-roll as long as a man's arm disbursed at his desk. One day his foreman came to him and reported that the gang had struck a vein of white quartz, entirely barren of ore. "Never mind," said Mr Lansell, "you keep on at your work as long as my money holds out. You will find metal after a while, if there is none now."

A week of wearisome suspense went by and then the foreman came up the shaft smiling. He had run into a vast ore body of sulphurets of iron and mundic, the former carrying gold to the value of about $60 per ton. The claim bears a name characteristic of the country, "The New Chum," which is equivalent to the American "Greenhorn" or the Oregon expression "Tenderfoot." The brave and lucky owner of this handsome property stands around like a successful husbandman looking at his ripened grain. He will never leave Sandhurst, the scene of his trials and struggles, in which he risked one substantial fortune that he might make another of greater amplitude. A man of less obstinacy would never have dared undertake it, while a man with less ready money to his credit would have been obliged to "let go" and abandon it before it was 600 feet in depth. I have merely mingled this case out of a dozen that have come under my notice, to show the tenacity with which Australians are wont to adhere to a proposition. Slower by far than Americans to beget an enterprise, they never like to abandon it while there is a ray of hope left.

MINING CITIES.

The city of Sandhurst lies on Bendigo Creek, 104 miles west-southwest from Melbourne, and had 42,000 people in 1853, most of whom lived in the canvas tents or brush shanties of that period. As new alluvial "strikes" were made elsewhere the population had decreased to 25,000 in 1869, and but for the development of the quartz industry must have shared the fate of many of those once brilliant and lively California towns that have long since passed out of existence. But from the time of the discovery of the Johnson's Reef ledges the old town took a new lease of life. On Johnson's Reef gold was first struck 482 feet below the earth's surface; in Garden Gully, 564 feet, and in New Chum 1,221 feet.

From the extreme north point of the Johnson Reef to the most southerly point of the New Chum there is a distance of about 2 miles. From the southerly end of Johnson's Reef to the northwest end of the Garden Gully it is about 7 furlongs. From the south end of Garden Gully to the northernmost end of the New Chum the distance must be not more than 1⅞ miles. On these three reefs are located some forty mining companies, the white poppet-heads and tall brick chimneys contrasting pleasantly with the white cottages of the miners. The present population of the city, which now includes the adjacent towns of Golden Square and Kangaroo Flat, cannot be less than 38,000.

Seldom do inland cities display as much enterprise as is to be found in these old Australian towns. Sandhurst maintains a school of mines, which would be a credit to San Francisco or Denver; also a botanical garden and tropical fernery, the latter of which surpasses all other ferneries in Australasia. She has charities in the shape of hospitals and

orphanages fully equal to anything in San Francisco; and the old mining reservoir of her "placer" days has already been widened into a beautiful lake where aquatic contests take place nightly. The red hills about Sandhurst are admirably adapted for culture of the grape, and will be the vineyards of the future. At present the gold yield is the main stay of the place. Twice a month returns to the Inspector of Mines are made under oath, and that official posts these upon a blackboard in front of his office. Of thirty-six companies which reported on the night of my visit, eleven had taken out over 200 ounces of amalgam, worth, say, $12 per ounce, for the previous fortnight; nine more reported over 120 ounces; thirteen more had reported from 50 to 75 ounces; and the remainder had qualified to amounts varying from 12 to 32 ounces. The severest penalties are prescribed by law for falsification of these returns.

The public buildings of Sandhurst are good enough for any city in the world, being built of a dull yellow sandstone with facings and pillars of granite obtained from the quarries of Castlemaine, 28 miles away. The public library contains something in excess of 8,000 volumes and has an active roll of 720 members at 5 shillings per month, which more than pays all current expenses. Lectures are delivered every Wednesday evening during the winter months free to members of the library, who are also admitted free to the art gallery which is in the same building. Here may be seen several gems of British art, purchased by the trustees of the gallery from bequests left to the library and gallery by successful citizens of the place, who have shown true and manly gratitude to the place where they rose from poverty to light and power. There can be no doubt of the future of so grand and large-hearted a people.

Leaving Sandhurst by train we come to Castlemaine, which has seen its best days as a mining town; thence, by way of Maryborough, Talbot, and Creswick, to Ballarat, which has been for nearly forty years the largest gold-mining city in the world. It was founded in 1852 and since 1854 has never had less than 40,000 population. It would have taken, at any period during the same epoch, the thirteen largest mining towns in all California to have made up the sum total of this big and beautiful city of Ballarat, unquestionably the most picturesque city in the world of its age and size. Situated on the banks of the fair Lake Wendouree, with grassy lawns sloping to its placid waters, a drive of a few minutes will bring you from the busy city to the exquisite botanical gardens where the rose of England, the magnolia of Florida, and the rare orchids of the Himalayas grow side by side. At one end of this lovely garden is a hall of statues, which contains five pieces of statuary, the center-piece being the "Flight from Pompeii," of life size, and four smaller statues, "Modesty," "Rebecca," "Judith," and "Autumn," which cost $20,000 and were bequeathed by the late Thomas Stoddard, one of the successful miners of Ballarat, who, after bequeathing a princely fortune to relatives in England, left this exquisite legacy to

the city where he had endured the privations of earlier life and had risen from poverty to affluence.

The output of the alluvial diggings near Ballarat from 1852 to 1865 was so enormous that an armed escort, furnished by the colonial government once a week, became necessary for the transportation of gold dust from Ballarat to Melbourne. In all the larger cities throughout the colonies are to be found millionaires who got their first start on the high road to affluence from their mining days in the alluvial gold beds of Ballarat. The Melbourne banks all have their branches at Ballarat, and it is now chiefly through them that remittances are made and the sales of gold dust effected.

Twenty-nine quartz mills are in operation between Mount Buninyong on the east and Lake Wendouree on the west, in which from twenty to sixty stamps in each are at work. One of the most successful of these is the "Band of Hope and Albion Consolidated," which paid in the three years ending June 30, 1888, the enormous sum of £563,495, its total amount of dividends for the previous half-year being £3,928, after paying £524 in salaries and £12,053 in wages; also £2,797 for machinery and £4,657 for fuel and supplies. It has a mill of thirty stamps, driven by a vertical engine of 90 horse-power which also works the pumps and forces cold air down the shaft, which is now at a depth of 1,415 feet in the No. 7 shaft. The property covers 193 acres of ground and the superintendent is Mr. R. M. Sargeant. Up to the time of consolidation of the two companies the yield was—

Band of Hope Company	£878,000
Band of Hope Extension	402,000
Albion Gold Mining Company	900,507
Total	2,180,507
Alluvial mines	484,000
Total	2,664,507

In the mill are to be seen the following American machines: Two sets Wheeler's pans, two concentrators, and ten shaking-tables of Hailey's patent. They also use a steam-hammer for breaking quartz before it is fed to the stamps. Much of the gold is in the form of pyrites, which is roasted in a large furnace and then rolled by the barrel process. The cost of this work is estimated at £2 per ton of pyrites, and the cost of crushing the ore as well as raising it to the surface is about 16*s.* 6*d.* per ton. The consumption of fuel is at the rate of 80 tons of coal and 100 tons of wood per week, the amount of quartz crushed being 5 tons to each ton of wood consumed, or 23 tons of rock to each ton of coal. Up to June 30, 1888, the shareholders had received in dividends nearly 44 per cent. of the output of the mine. The sulphurets, after the gold has been extracted, are ground up into an article of paint which is nearly fire-proof and greatly in demand for painting roofs. The company has sold £265 worth of this paint in the past twelve months.

This is but one of a dozen good paying and apparently enduring mines by which the beautiful city of Ballarat is kept up; in addition to which it has the handsomest public art gallery, outside of Melbourne and Adelaide, that can be found in the colonies. One picture alone, "Ajax carrying off Cassandra," cost £3,200; and there are other pictures of less size but equal merit. The board of directors of this gallery have purchased from the British collection over £8,000 worth of pictures, now in the Centennial Exhibition. The contrast between Ballarat and some of the larger mining towns of California and Nevada, where the youth of both sexes have been allowed to grow up in vice for the want of ennobling surroundings such as these, is something painful for an American to contemplate.

FOUNDRIES.

But Ballarat is not alone dependent upon mining for her prosperity. South and west of the city, for about 45 miles, stretches away a beautiful expanse of farming country amidst which are the beautiful lakes Burrumbeet and Elangamite. Most of the produce of this region finds its ready market in the pretty little city of Ballarat, or the flourishing towns of Creswick and Maryborough aforementioned. Ballarat likewise has large foundries, where is made most of the mining machinery employed in quartz crushing; and at the Phœnix works locomotives have been built for the colonial system of railways. Up to July 1, 1888, these works had turned out two hundred and thirty-one locomotives of 56 tons and upwards, and forty-seven engines, whose weight varied from 42 to 54 tons; and while these locomotives do not present as neat an appearance as those built at Paterson, N. J., they are quite as powerful and equally adapted to the traffic for which they were designed. No tourist visiting Australia should fail to see Ballarat. The only place in America which is in anywise a rival to it is Denver, and that is apt to suffer by comparison in many respects.

MINERS.

The miners are, as a class, sensible people. In the great coal strike at Newcastle the miners of Ballarat and Sandhurst were invited to join the strikers, which they declined to do, as they were content with their lot and did not propose to quit good work for imaginary grievances. The average pay of a quartz miner in Australia is about $3.10 for eight hours work each day.

MOUNT MORGAN MINE.

The province of Queensland contains what is so far to be regarded as the most extraordinary gold mine in the world, the famous "Mount Morgan," situated near Rockhampton. It is divided into one million shares valued at £16 each. I know of two of its shareholders whose

incomes are over $200,000 per annum, and seven more whose bank accounts are annually swollen to the extent of $100,000 each by the output of this greatest of all bonanzas.

One Morgan, a sheep-herder, had a small station at the foot of this mountain, which he held under lease from the government. One night along came a prospector, or "fossicker," as the Australian vocabulary puts it, who asked for shelter and said he was hunting for quartz. Morgan laughed and said, "You are welcome to all the gold you find about here." The man went away next morning and had not gone far up the mountain side when he found portions of rock rendered porous by the action of intense heat. The specific gravity of what he held in his hand seemed to puzzle him, but there was no chance to lose money on the operation. If it contained gold, here was an untold fortune, as the mountain was one solid mass of the unknown metal. If it were only nickel or platinum, its proximity to the sea-coast rendered it certain of being worked at a profit. The "fossicker" went back to Sydney, and assays were made of his samples of rock, which showed gold to values varying from £20 to £90 per ton. A syndicate was at once formed and purchased Morgan's sheep farm for £25,000 with which he returned to England a richer man than he had ever hoped to be. At first the purchasers were at a loss how to work their new property, as no such ore had ever before been found in either California or Australia; and as no works could be had to illustrate the workings of auriferous rock in the mines of Siberia, the new owners were sorely puzzled for a satisfactory process. They at length decided to pulverize the rock, which was soft and easily quarried, by a dry-crushing process like that used in Arizona, after which the powder should be subjected to a process of chlorination. In this they have been most successful, as the output of the mine narrates its golden legend from year to year. In 1859 William and Oscar Maltman erected chlorination works at Grass Valley, Cal., and began the purchase of sulphurets from the miners, who saved them with concentrators and "buddles," but they were obliged to abandon the scheme as unprofitable, as the cost of chlorination exceeded $40 per ton. Since that time, under the progress of scientific research, the expense attendant upon this work has slowly and surely decreased until now the proprietors of Mount Morgan have been enabled to reduce their pulverized rock at a cost of about $10.25 per ton. The gold comes out of the furnace in a liquid form resembling Chablis or Sauterne wine. After being filtered through charcoal the carbon is burned and the gold comes out in hard and dry flakes. The yield of Mount Morgan for 1887 was £229,750, and as the reduction works have since been doubled in capacity, and the cost of reduction materially diminished, it is fair to infer that it will be increased to $2,000,000 for Australia's centennial year.

Indeed the Queensland gold yield is already such as to warrant the

belief that it is destined to become the wealthiest of all the colonies in this respect. If you compute by districts, the gold yield of Queensland will make a most remarkable showing:

Gympie (since its discovery)	£4,632,170
Rockhampton district for 1887	349,750
Port Curtis district for 1887	40,746
Charters' Towers district for 1887	499,544
Ravenswood district (since its discovery)	1,112,531
Etheridge district (since its discovery)	1,024,637
Croydon district (since its discovery)	90,763
Hodgkinson district (since its discovery	803,161
Palmer district (since its discovery)	4,897,862

MILLS.

In concluding this portion of my report, I must not omit to mention the primitive methods of mill work done by the various mining companies throughout the colonies. So far as the underground work goes no people can surpass the Australians in mining. They are masters in the art of ventilating mines as well as of that of getting rid of water in the shafts and tunnels. But for the crushing and reduction of quartz they have much to learn of America. The rock-breaker, or horizontal steam-hammer, as it is often called, which is deemed indispensable in all American mills, is conspicuous by its absence in nearly every mill in the colonies. The consequence is irregular feeding of the stamps, a general derangement of the batteries, requiring often a delay of months to repair. The use of the rock-breaker, on the other hand, brings the quartz to a uniform size and the stamps are evenly fed, thus greatly decreasing the wear and tear of the plant.

In a score of other material matters I have noticed an absence of that systematic mill work which is so easily to be perceived in the quartz mills of California, Nevada, Oregon, and Idaho. Therefore I am confident that any good and competent mining millwright can come over to Australia and go back to America in ten years with a fortune in his pocket. But to do this, the man must be one of self-denial and thrift. The Australians are a people of a generosity akin to extravagance, and the man who falls into their habits will be certain to become impoverished. They are willing to learn in this matter of machinery as in everything else, but the man who is to be their teacher must be a practical mechanic.

Very respectfully,

THOMAS B. MERRY,
Assistant U. S. Commissioner.

HON. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON SHEEP AND WOOL.

By Assistant Commissioner ALEXANDER CAMPBELL.

MELBOURNE, *December* 22, 1888.

SIR: Having been assigned by you the work of preparing a report on the sheep and wool industries of the Australian colonies, I respectfully submit the following as the result of my investigations.

The introduction of sheep into Australia dates from the ninth decade of the last century, but up to the year 1860 its success as an industry had a doubtful existence. In that year the total exports from all the colonies amounted to only 160,997 bales, valued at £2,897,949. From the year 1860 there seems to have been a new life imparted to the wool-growers of all the colonies and the most unprecedented development of country and flocks took place ever experienced in the world's history. In 1886 the number of bales amounted to 1,020,005; at the low price prevailing, the value amounted to £14,280,070 sterling—something over $71,000,000. The meat, hides, and tallow exported would greatly augment this value. It is not to be expected, or hoped, that in the next twenty-eight years the number and value will be increased in the same ratio. As statistical information can be obtained from recent tabulated statements, this report will, for the benefit of the American wool-grower, be confined to the present status of the wool and sheep of these colonies, giving only such figures as are necessary to show the increase from year to year.

The first export of wool to England was from Port Jackson, in 1807, and was only 245 pounds. In 1815 there were exported 32,971 pounds; in 1821, 179,633 pounds; in 1837, 7,789,777 pounds; in 1860, 56,349,066 pounds; in 1870, 122,972,916 pounds, and in 1880, 277,737,268 pounds, while the quantity exported to London alone, in 1887, amounted to 390,789,900 pounds, or 1,116,538 bales. I have not been able to find the amount sent to the United States, or consumed in the colonies. I do not mention the amounts from the different colonies, but the gross amount from all. According to the returns compiled by Mr. H. H.

Hayter, government statistician, Victoria, the number of sheep depasturing in the year 1887 was, in—

New South Wales	46,965,152
Victoria	10,623,965
Queensland	12,926,152
South Australia	7,254,000
Tasmania	1,547,242
Western Australia	1,909,940
Total	81,226,471

By including New Zealand a grand total of 97,903,922 is obtained.

The area in square miles on which this vast number of sheep is maintained is 2,971,003.

BREEDS.

All breeds of sheep have been experimented with in the colonies, the Lincoln, Cotswold, Saxon, Southdown, and a number of other varieties, but it is almost universally conceded that the climate of all the colonies is the best adapted to the production of the Merino sheep. It seems that the grass contains the qualities necessary for the production of the best staple and finest quality of wool known to the world. It has been frequently stated that a cold climate is requisite to the production of the finest wools and furs, and that in tropical countries all wools and furs have a tendency to hair and thinness on the body of the animal. That the Creator has wisely made this provision of nature—that where the more abundant covering necessary to protect the animal from the rigor of the climate was required, it was produced; and, on the other hand, where not required it was not there. This theory has surely been set aside in the colonies, for in the greater part they have neither snow nor ice, yet a fineness of fiber and denseness of wool on the sheep exist not equaled in the coldest portions of the United States or of Canada. The dryness of the atmosphere and the cool, constant winds during the winter months in the colonies seem to make this dense and fine coat of wool essential to their protection.

During the shearing season, which commences in the north in Queensland during the month of August, coming on through New South Wales and South Australia, and ending in Victoria about the last of October, I visited a number of stations in different sections, and feel that a description of some of them would not be uninteresting to sheep-breeders in other countries.

The number of sheep handled on some of the best improved stations is fabulous; and many engaged in the business in other countries take the statements of reporters with many doubts as to their truthfulness. Sheep stations, or runs, in all the colonies are either leased from the government or held as freehold. When land is held as a freehold it is bought outright at public sale from the government, or leased on ten years with covenant to purchase, and is never sold at

less than £1 per acre, and sometimes at a much greater price. Large blocks or sections of land, sometimes containing hundreds of square miles of country, are put up for lease, and are leased to the highest bidder for a term of years, the government always reserving the right of resumption by giving a specified time of notice to the holder, who is paid by the government for any water improvements made during the term of his lease. Want of water in all the colonies, except New Zealand, is the great drawback, and in fact the only hindrance to an unlimited prosperity and increase in sheep and wool growing. The original settlers and wool-growers of the country are called "squatters," and have always had a commanding influence in the government; many of them are Oxford and Cambridge men. Men of culture and refinement came here in their early days to better their fortunes, and have made all their improvements substantial, and conducted their stations with intelligence. There are also a large number of educated Scotchmen here, who do everything in the way of improvement in the most substantial manner. Both English and Scotch have sent their children home to be educated, and the result is that in all the colonies there is a large number of men and women educated in England. Since the days of 1796, when Mr. John McArthur brought from the Cape of Good Hope five ewes and one ram of the Merino breed, these intelligent squatters have spared neither time nor expense in the improvement of the Merino breed of sheep. There are a great many of the Merinos, most of which have descended from Spanish flocks, and are called by different names, such as French, Pauler, Silesian, Saxon, Liones, Australian, and American Merinos. Vast sums have been paid, sometimes thousands of guineas, for a single ram of the Merino breed; and judging from the size, fiber, and density of wool on the "show" sheep exhibited in Melbourne, by R. Goldsbrough & Co., in October last, and on some stations, I could not see, after a careful examination, how there could be any further improvement. They were as near perfection as it is possible to make them in size, fineness of fiber, and length and density of wool. The Cotswold and other breeds exhibited were the finest I had ever seen; but as before stated, all breeds of sheep in the Australian colonies have given way to the Merino.

In the year 1881 some of the large Riverina flock-masters, becoming impressed with the much-vaunted robustness of character and density of fleece of the American branch of the Merino family, imported both rams and ewes to cross with the Australian sheep. The chief importers so far in New South Wales have been Mr. Thomas McFarland, of Yathong, who purchased in 1881 the celebrated ram "New York," from the stud of Mr. S. B. Lush, of Batavia, N. Y.; Messrs. McFarland Bros., of Barooga, who commenced with "Matchless," said to have been the best ram in America at the time; Messrs. Hay & Sons, of Boomanoomana, who selected from the flocks of the Hon. George Hammond, of Vermont, Mr. F. S. Barston, of Vermont, and Mr. S. B. Lush, of Batavia, all of the old Attwood stock; Messrs. Brown & Co., of Tuppal, and Mr. Samuel McCaughey, of Coonong. The only Victorian flockmaster to introduce American sheep into his flock was the late Mr. James Winter, of Dhuringile, who purchased a few Vermonts. The only Tasmanian stud-breeders were Messrs. W.

Gibson & Son, of Scone, who imported one ram and three ewes from California merely as an experiment, the progeny of the cross being kept quite distinct from the famed "Scone" Merinos. In fact the experimental stage can hardly be said to have been passed, and comparatively little American blood has yet been introduced into Australian flocks. The records of "Woolly" and other noted American Merinos whose fleeces weighed from 50 to 60 pounds have never been approached here by any imported sheep; the heaviest shorn, as far as the writer is aware, being about half those weights, when the loss in scouring was 75 per cent. For actual weight of wool the Wanganella shearing of 1885 beats most of the American records; and to this could be added numerous other instances of heavy clippings in various parts of Australia did space permit. At Mr. James Lee's, "Larras Lake" station, Molong, twenty rams clipped, on an average, 21 pounds 5 ounces in 1886. At Mr. Samuel McCaughey's, Coonong, and F. S. Falkiner's, Bonooke, have also been shorn rams clipping over 20 pounds of clean bright wool.

Aside from this second introduction of American Merinos the importations of fine-wooled sheep have been unimportant, which is mainly due to the fact that our stud-flocks, which have reached a very high state of perfection, are quite equal to the demand made upon them. By intelligent care and judicious selection, assisted by an unrivaled climate, our breeders have succeeded in perfecting types of the Merino suitable for every temperature and district of this continent where sheep will thrive, thus enabling Australia to produce all classes of fine wool used in the manufacture of textile fabrics ranging from a soft, silky material of extreme fineness and rare beauty down through the numerous intermediary grades to the bold, shafty, combing sorts, as represented by the "Wanganella" and "Bonooke" flocks in New South Wales, and the "Canowie," "Levels," and "Bungaree" flocks in South Australia. All the essentials that go to make a perfect Merino wool are to be found in the pure Australian flocks of to-day, where both climate and pasture are superior to those of other countries for the production of high-class wool.

On the 19th of August, 1885, in the presence of a number of Riverina flock-masters, the following fleeces were clipped and weighed at Wanganella:

Animals.	Average.		Greatest weight.	
	Lbs.	*Ozs.*	*Lbs.*	*Ozs.*
Fifty two-tooth rams	17	3	19	9
Twenty-five four-tooth rams	19	9	21	1
Twenty-seven mixed ages	19	6	22	5
"Premier" II, five-year old grass-fed ram	21	9		
"Invincible" II, five-year old grass-fed ram	21	13		
No. 206, three-year old ram	22	5		

SHEEP-RAISING STATIONS.

On Hill River estate, South Australia, a freehold of 50,000 acres owned by the Hon. J. H. Angus, M. P., one of the largest sheep and cattle breeders in all the colonies, there were shorn last year 50,103 sheep, yielding 389,308 pounds of pure, clean wool. Average per sheep, including 15,190 breeding ewes, 9 pounds 4⅔ ounces; average per head for lambs, 3 pounds 11¼ ounces (lambs are shorn at six months old); average per head, including lambs, 7 pounds 12⅓ ounces; average per head for dry ewes of all ages, 9 pounds ¾ ounces; average per head for wet ewes, 8 pounds 13½ ounces; average per head for wethers of all

ges, 10 pounds 2½ ounces; 6,671 clippings, 67,742 pounds; stud rams ut from 15 pounds 10 ounces to 20 pounds 1½ ounces. This wool was old in February and March, the bulk realizing 11*d.*, 11½*d.*, and 1*s.* per ound in the grease. The Hon. J. H. Angus has on his "Collingrove" state a large number of sheep equal in quality to those on Hill River.

Bungaree station, a freehold of 86,000 acres, owned by Hon. G. C. Iawker, M. P., situated in South Australia, 60 miles north of Adelaide, s amongst the best improved stations in any of the colonies. The sheep n this station are mostly of the French Merino breed, and after over forty ears of careful breeding are now as near perfection as it is possible to ring a flock of such numbers. On this station there are 80,000 sheep ooled all over from their nose to their toes. They are of very large ame, and while they have never been given a mouthful of grain of ny kind, yet at shearing time they look like the best corn-fed wethers ent to market in the United States. This estate is inclosed by a wire ence and subdivided into fields which are called "paddocks." The osts are of substantial gum with an iron post in the center; and iron ates leading from paddock to paddock. All the barns, stables, shear- ng sheds, and tenant houses are built of stone and covered with corru- ated-iron roofing. The residence is an imposing edifice surrounded by any acres of flower gardens and trees, including fruit trees, such as range, lemon, apple, pear, peach, plum, apricot, and quince. Currants, ooseberries, strawberries, and grapes grow to perfection.

The shearing shed is a model for neatness and convenience, with yards nd pens all connecting, so that no time is lost in handling the sheep. They are driven into a system of pens in the center of the shed and are horn on a clean floor, all around the sides of which are small doors onnecting with pens outside; two shearers are allotted to each pen and he sheep when shorn are passed out into pens outside, where they are ounted and each shearer given credit for the number shorn each day. hey are then passed through a long narrow lane, called a "race," and ach sheep branded as it passes out.

During three days, a part of which I spent in the sheds, they were hearing 3,500 per day. About one hundred men and boys were em- loyed in bringing the sheep to the shed, shearing, rolling, grading, aling the wool, and branding the sheep. There were twelve tables; ne man at each table, and boys to bring the wool from the shearers. ll the wool was closely skirted, belly, head, leg, and neck wool all rown aside, and none but pure, clean wool rolled in the fleeces. The eeces were taken on a truck to the press where a grader examined each leece before its going into the press box, seeing that wool of uniform taple was put in the same bale. The belly, neck, and leg wool was aken to a scouring house and scoured before baling. The bales, which verage between 300 and 350 pounds, were compressed or "dumped" y an hydraulic press, and iron hoops put on before leaving the shed. he wool from this station is hauled over a fine macadamized road on

large wagons, a distance of 29 miles, to a railroad depot, where it is shipped direct to the sea-board to be forwarded to London. These wagons were built in the colony and are remarkably strong. We saw pu on one of these about 11 tons; it was drawn by eight large Clydesdal horses. Each wheel of the wagon weighed 500 pounds, with a tire 1 inches wide and 2 inches thick, with all other parts strong in proportio The roads in New South Wales, Victoria, and South Australia we built by the government, and were in many parts laid out for stoc driving, 132 feet wide, macadamized in the center about 22 feet with white limestone that cements well. There could not be found bett roads in any portion of the world. The whole of the Bungaree est is covered with a coat of native grass, and I might say free from noxious weeds. The country is rolling, and many of the paddocks ha shade trees scattered over the hills. The trees are of the Eucalyp species, red and blue gum, and the oak. These latter resemble v ry much the live oak of Louisiana, and add greatly to the beauty of the scenery. Grass seed is sometimes troublesome in the belly wool, but the sheep are mostly shorn before the grass ripens, and in this way all trouble is avoided.

Every paddock on this estate is watered either by wells, dams, or running water. Besides this estate Mr. Hawker has two others farther north, on which he has 100,000 sheep of the same breed. This year he had on Bungaree 27,000 lambs and on the other two places 35,000, or a total of 62,000. The average weight of his clean wool this year all through was about 9 pounds per head.

WAGES.

The price paid for shearing through the colonies runs from 15 to 16 shillings per hundred, or about 4 cents per head, with tucker or grub, as board is here called; day labor running from 5 to 7 shillings per day and board.

In the same range of country there are many fine freehold estates, conducted in about the same systematic manner. Hill River, the estate of the Hon. J. H. Angus, M. P., before mentioned; Kadlunga, a neat stud station, the property of Chief-Justice Way; and Martindale, the property of Mr. Edmund Bowman. Farther north Canowie, the property of Messrs. Sanders, James & Co., containing about 60,000 acres of freehold, and noted all over the colonies for its fine breed of sheep. Still farther north is a large section of country held by a syndicate and managed by Mr. Phillipson. On this estate, Beltana, there are 200,000 sheep, 16,000 cattle, 4,000 horses, and 300 camels. The camels are used to pack the wool to the sea-board. I might mention here that in this country land that will carry one sheep to the acre the year round is considered very good. One sheep to 2 acres is also counted good, but there are many thousands of square miles that will not carry more than one sheep to 10 acres.

LAND IN SOUTH AUSTRALIA.

There is a vast section of country uninhabited in the interior of South ıustralia, which in time will be brought into market both as a pas-ɔral and mineral country. Exploring parties are constantly being sent ut, and as water is found the country will be occupied.

We visited Narracoorte, a station of Thomas Magarey, Esq., in the ɔutheast some 40 miles from the sea-board. This region is well watered nd seldom suffers from drought, and produces the very finest quality f wool raised in the colony. The sheep are a mixture of the Merino nd Saxon, and are small in size, but carry a dense and fine fleece. It ı claimed that the properties of the grass in this section are not suitable ɔr the larger and coarser breeds of sheep, but just adapted to this par-cular breed. This station, and in fact all the surrounding country, is ɔnced off in paddocks by wire fencing and is more like a farming country ıan that farther north.

Rabbits give the squatters a good deal of trouble, and on many places wire netting, at a cost of £30, or $150 per mile, is stretched along ıe wire fences for miles, to keep them out of the paddocks; besides, a ırge number of dogs and professional rabbit hunters are employed ɔring the year round endeavoring to exterminate them. From $5,000 ɔ $10,000 a year is paid on some of the stations for rabbit killing alone.

A curious feature on this Narracoorte station are salt and fresh water ıkes in close proximity, not half a mile apart. The salt-water lakes ·e so strongly impregnated with salt that when they dry up in the iddle of summer a deposit of salt is left on the surface, looking at a ttle distance like a body of snow, leaving nothing to do to save this ıre white salt but scrape it up, put it in bags, and haul it to the store-ɔuse.

DISEASES.

So far as I can learn sheep are free from all kinds of diseases in all ıe colonies; in fact I have not seen a diseased sheep of any kind among ındreds of thousands. Foot-rot could not exist except in a few local-ies on account of the dryness of the climate. The scab once prevailed, ut the intelligent squatters, by the most prompt and heroic action, ;amped it out. The severity of the law, the watchfulness of wool-rowers, and promptness of action will prevent any disease ever getting foothold in these colonies.

MUTTON.

Within the last few years a market has been found in England for ast numbers of mutton sheep. In the large steamers refrigerators are tted up to carry many thousands. Recently from New Zealand one ıip carried to England 16,000 carcasses, which arrived in good condi-on. Australian mutton is fat, juicy, and of very fine flavor, but that f New Zealand is said to be better.

SALE OF WOOL.

In former years the great bulk of wool was sent to England and sold at auction, but in latter years houses have been established in all the principal cities of the colonies, especially Sydney, Melbourne, and Adelaide, where auction sales are held twice every week during several months of the wool season. It is estimated that at least one-third of the wool is sold here, and every year the squatters are becoming satisfied that it is best to sell at home, as they realize more promptly and at satisfactory prices. In early days when sheep had to be shepherded it required a greater number of men and was more expensive than now, when a large proportion of the country is inclosed by wire fences. Twenty men will serve as boundary riders and perform all necessary work on a station carrying 100,000 sheep, except at the shearing season. There is a drought every few years that diminishes the number of sheep by many thousands, but with a few good years the squatter soon recovers. Mammoth fortunes have been accumulated since the introduction of sheep into the colonies. In a few years with a very small beginning herds of cattle and flocks of sheep have increased to incredible numbers, as is instanced by Mr. Tyson, of New South Wales, who in less than forty years has accumulated 1,000,000 of sheep and 1,000,000 of cattle, and is said to be the largest stock-raiser south of the equator.

CONCLUSION.

It is a strange sight to see these vast herds of sheep and cattle covering the hills and plains, so brown and dry from November till March, the summer months here, and yet this dry grass is more nourishing, and the cattle and sheep are fatter than during the winter months of June, July, and August, when the grass is green. The lambing season begins when the grass puts out in April. In Victoria, the smallest colony, there are some 10,000,000 of sheep, and stations with every modern improvement. She is fully up to her capacity. New South Wales, with more sheep than the United States, has still a vast undeveloped country. The question now arises, will not the production of wool get ahead of the consumption? The Argentine Republic and Uruguay, with over 90,000,000 of sheep, and the business only in its infancy, will soon press Australia in quantity, but not in quality. In Russia and Austria-Hungary, the United States, and, in fact, in all countries where sheep will thrive, the business is being pushed to its utmost. Surely there will be no want of raw material to clothe the human family with the best and most comfortable of fabrics.

In the opinion of the writer, the sheep and wool industry will always be the leading interest in the colonies. The uncertain rain-fall renders agricultural and horticultural pursuits hazardous, except along the coast, where there is now a lively interest felt in the culture of grapes, olives, oranges, lemons, almonds, and other fruits. Grape culture has

been in operation at least twenty or twenty-five years, and is managed with great care, and in some cases with considerable profit. Sir Samuel Devenport, near Adelaide, has made a success of both grape and olive growing. We visited Pewsey Vale, 40 miles north of Adelaide, the model estate of William Gilbert, Esq., a freehold of 20,000 acres, who has, besides keeping some 16,000 choice sheep, 300 thoroughbred cattle, and 100 horses, a flourishing vineyard of the choicest grapes, from which he manufactures many thousand gallons of wine annually.

Very respectfully submitted,

ALEXANDER CAMPBELL,
Assistant U. S. Commissioner.

Hon. FRANK MCCOPPIN,
U. S Commissioner.

REPORT ON THE SUGAR INDUSTRIES.

By Assistant Commissioner ALEXANDER CAMPBELL.

MELBOURNE, *December* 24, 1888.

SIR: The sugar production of the Australian colonies is exclusively confined to New South Wales, Queensland, and the Northern Territory. In the Northern Territory cane of different varieties has been introduced in small quantities, and experimented with and found to grow luxuriantly. The climate and soil are peculiarly adapted to the culture of sugar, and no doubt when the requisite labor is introduced the industry will prove very profitable. The insufficient supply and high price of labor have discouraged the planting of large tracts.

NEW SOUTH WALES.

The first agricultural report in which the cultivation of sugar-cane is mentioned in New South Wales was in 1863, when 2 acres were reported as having produced 280 pounds of sugar, and of this 1 acre in the northern portion of the county of Bathurst produced 220 pounds; the other 30 pounds was grown on the banks of the Macleay River. This district was for a number of years the only region where cane was cultivated to any extent. Some years later it was pushed northward to the rich sections of the lower valleys of the Clarence, Richmond, Tweed, and Brunswick Rivers, where the settlers engaged to a considerable extent in growing cane. They built mills, and sugar manufacturing became well established, and was considered the best paying industry in the northeastern part of the colony. The Richmond River is considered the center of the sugar-growing interest. In 1886 there were four hundred and ninety-four farms or plantations, varying from 200 to 500 acres in extent. There were planted that year 9,778 acres, or about two-thirds of all the sugar planted in the colony. The yield from 4,066 acres amounted to 121,277 tons of cane, an average of nearly 30 tons per acre. On the Clarence River in 1886 there were three hundred and seventy-five farms on which sugar was grown. The farmers only cultivated a portion of their land in cane; very few devoted their entire farms to the cultivation of cane, some planting 10, 20, and even as many as 100 acres in addition to their other crops. The yield on 1,809 acres was a little over 25 tons to the acre. In this district 5,121 acres were planted, but

as the crop is not annual here only a portion was cut, the other remaining over to the next year. On the Richmond River there is a mill owned by the Colonial Sugar Refining Company, which has all the modern improvements, and is considered equal to any in the world. The sugar manufactured is as good as the best Mauritius and West India samples.

A general improvement took place in sugar culture from 1863, and year after year a steady increase in the average till 1884, when from sundry causes there was a falling off of 14 per cent. of the amount planted. The low price of sugar and the importation of German and other sugars discouraged the small planters, and many of them abandoned the business.

The whole crop of the colony amounted in 1886 to 167,959 hundredweight of sugar. A great depression prevails now among the planters, but it is the opinion of many well-informed settlers that the industry will be sustained.

QUEENSLAND.

In Queensland from 1847 to 1850 attention was first given to the cultivation of sugar-cane, and some was grown on the Brisbane River and Moreton Bay lands. The first sugar was made in 1852 from cane grown in the botanical gardens. Great interest was awakened in the business, and in the years following a decided impetus was given to the industry. Cuttings of many varieties of cane were introduced by the Acclimatization Society and the small farmers experimented on its production. The first sugar colonies were formed in 1864 in Brisbane, Maryborough, and Mackay. The last named is now the sugar capital of Queensland. The first official returns show that in 1867 six mills were at work, producing that year 168 tons of sugar and 13,000 gallons of molasses. Capitalists freely invested, and large sums were advanced to planters. Development was rapid and in 1872 operations were conducted at sixty-five mills, which crushed 5,000 acres of sugar-cane, yielding 6,266 tons of sugar and 357,614 gallons of molasses. For a number of years the cultivation and manufacture were very successful, when a disease called "rust" attacked the cane and created a panic among the planters. The money lenders became alarmed and closed out many, causing great distress. The planters experimented with hardier varieties of cane, and by planting it thinner on the land got rid of the disease, when capitalists again came to their rescue and in 1879 great speculations were made in sugar lands. Immense refineries and mills were built by companies with large capital and for a time all went on swimmingly. Towns were built as sugar centers, and there seemed to be great confidence in the future of the business; but again trouble overtook the planters—labor troubles, and two dry seasons in succession—in which the working expenses were enormously increased, while the incoming returns were fearfully diminished.

The "Kanaka" laborers (imported South Sea Islanders) became almost

worthless, and white laborers had to be substitued, among whom there was great mortality. Many of the planters sold out when the industry was in its most prosperous condition and realized large fortunes. Others less experienced took hold of the business when sugar began to decline and all the European markets were overstocked with the beet sugar of France and Germany. Notwithstanding all these drawbacks the planters felt that sugar of a much superior quality could be produced as cheaply in Queensland as beet sugar in France and Germany. Great economy was exercised in the management of the plantations, all kinds of expenses reduced, and better methods of manufacturing adopted. Still the difficulty of obtaining reliable labor continued and many were discouraged, while others contended that white labor could stand the work in these tropical regions, and that sugar could be produced by small farmers selling their cane to the mill-owners.

The legislature appropriated £50,000 for building small mills to be worked on the co-operative principle, and make small farmers independent of the large mill-owners, who worked black labor. In some districts small farmers have banded together and built small mills which they work jointly, and which seem to be successful and satisfactory. Sugar is successfully cultivated along the whole coastal district of Queensland, from the New South Wales border to Cooktown, a distance of 1,300 miles. In the middle districts gigantic refineries, with an under-ground system of pipes drawing the cane juice from the small farmers, undertake the manufacture of sugar; while in the north the establishment of immense mills at an enormous expenditure of money, and employing hundreds of laborers, has been the system adopted. Nerang Creek, flowing into the Pacific 45 miles south of Brisbane, has fertile alluvial soil suiting cane. Dairy farming, however, is taking the place of cane in this district, but at Coomera River, nearer the metropolis, it has been carried on with energy and success. The decay of the scrub has enriched this soil, rendering it extremely fertile to a great depth. The proximity of this district to the capital, however, has raised the value of sugar lands for other purposes, and, with the development of the saw-mill and timber industries, brick fields, dairy farming, etc., is making it too valuable for sugar culture; so it is being gradually relinquished. The next sugar district is that of Pine River, then Mooloolah, Maroochie, and the Buderum table-land, all to the north of Brisbane and worked by small farmers. All this history of the sugar interest of Queensland I take from a report of the Hon. H. Courtenay Luck, F. R. G. S.

Maryborough is the chief town of the district next in order. Here the sugar industry was early established. The sugar manufacture is carried on by Messrs. Cran & Co., at their immense refinery, Yengarie, the juice of the cane being supplied by the farmers, each of whom must have his own crushing machinery. The refinery is fitted with the most modern appliances, and is colossal in extent. The farmer has to cut, cart, and crush his own cane, while the juice previously charged with

lime to prevent acidity is either conveyed to Yengarie in trucks, carts, or punts, or by the network of under-ground pipes by means of powerful pumps. Pacific Islanders are employed in this district, but occupation is also found for a large staff of plowmen, mechanics, and skilled white labor. Much progress has been made on the Burnett River with Bundaberg as its center, the soil and climate being good; Millaqui — the gigantic refinery, performs duties similar to that at Yengarie and is supplied with juice in the same manner. The sugar-growing district of Rockingham is in a comparatively dry belt of country. There is a mill at Yeppoon. Mackay, the sugar metropolis, is situated in the tropical district of the colony, and here the industry has attained its greatest development. Immense sums of money have been expended in the district, of which this town is the sea-port, in the cultivation of the cane and manufacture of sugar. Every modern appliance is found in the mills, all of which are of great capabilities and situated upon large private estates, and which require an immense area of cane for their maintenance. The farmers also dispose of their crops to these mills, which latter, however, rely primarily on the cane grown upon the estates to which they are attached. On these estates there are miles of railway and modern powerful steam-plows; while at night the mills are lighted by electricity to enable the hundreds of laborers to feed the rollers with cane. Notwithstanding the depression which existed, following on the years of prosperity prior to 1883, the confidence of those who have invested their capital in sugar remains unabated, and the output of sugar will continue to increase. It is in this district, as before stated, that the central mill system under government aid is being first tried—an experiment watched with great interest by all classes of the community. The very rich high and dry level delta formed from the immense district drained by the Burdekin River was utilized for the successful growing of sugar-cane. The supply of under-ground water at little depth being practically inexhaustible, irrigation has been adopted, for, notwithstanding its position within the tropics, the district is a dry one. The undulating contour of much of the land adapts it for the flow of water, which is pumped into furrows between the canes by powerful engines driving large centrifugal pumps. The results of irrigation are most satisfactorily seen in the increased yield of sugar, and the prospects in this district are most cheering.

Sugar-cane has been grown on the Herbert River for many years past — tropical rains are here copious and the soil on the lower Herbert a rich vegetable mould. The mills erected here are of immense capacity and the plantations have been managed with great energy and skill. The Colonial Sugar Company has here (as at Mackay) a gigantic establishment; miles of railway connect the mills with the farms, and the mills at night are illuminated by means of electricity. Geraldton is the center of the Johnstone River and the Cairns district, where the rain-fall reaches its maximum intensity, having soil unsurpassed for fertility and

ropical luxuriance. The cane is extremely heavy and the yield of sugar per acre exceeds that of any other district of the colony. Cairns, Hambledon, Port Douglas, and the Bloomfield River are sugar-producing districts. The inexhaustible fertility of the tropical scrub soil of the colony, the immense area available, freedom from drought, and wonderful adaptability for the growth of cane, point to the probability of a grand future for the sugar industry of Queensland when the labor difficulty is overcome, as ere long it must be. Notwithstanding the many troubles passed through by the Queensland sugar planters—labor troubles and dry and unprofitable seasons—the industry has steadily increased and is not likely to meet with so many disasters as in past years, as the planters are from year to year overcoming many difficulties that formerly depleted their income. The energy and thorough business way with which many of the estates are managed reflect great credit on the planters. Surely they have expended vast sums on their improvements, and when we reflect that the industry is in its infancy the wonder is that so much has been accomplished.

The population of Queensland is about one-third that of Louisiana and sugar has not been cultivated much over one-third the time; still the production in tons will compare most favorably with the early days of that State, when the question of labor gave no trouble. I am under many obligations to Hon. H. Courtenay Luck, F. R. G. S., Chief Secretary to the Melbourne Exhibition, for information, and hereto attach a statistical statement of the sugar product of Queensland, which he kindly furnished me.

Statistics of Queensland sugar in 1887.

Place.	Cane crushed.	Sugar.
	Acres.	*Tons.*
Eyr	2,776	5,972
Bundaberg	7,747	19,865
Caboolture	279	377
Cairns	1,150	2,050
Cook	372	738
Douglas	37	30
Egham	4,155	5,077
Logan	931	1,191
Mackay	13,497	16,588
Marburg	142	189
Maryborough	2,464	4,337
Nerilyan	2,251	3,189
Orang	307	354
Ormanby	5	9
Rockhampton	337	494
Taro	356	346
Total 1887	36,806	60,806
Total 1886	34,657	58,545
Increase 1887	2,149	2,261

Sugar mills		118
Molasses manufactured	gallons..	1,121,430
Rum distilleries		9
Rum distilled	gallons..	47,325

Very respectfully submitted,

ALEXANDER CAMPBELL,
Assistant U. S. Commissioner.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON TOBACCO.

By Assistant Commissioner R. L. MILLER.

MELBOURNE, *September* 15, 1888.

SIR: Chief Commissioner Hon. Frank McCoppin, of California, ssistant Commissioner Alexander Campbell, of Louisiana, and myself, pointed to represent the United States Government at the Melbourne ntennial Exhibition, arrived at Sydney, New South Wales, on the th of July, 1888, just five days before the formal opening of the Exhi- ion at Melbourne. On the 27th we left Sydney, arriving in this city 28th. We found the American Court to be in a fair state of prepara- n for the opening set for August 1, due to the judicious management d indefatigable work of Secretary Marix, Assistant Commissioner F. Wheeler, of New York, and Assistant Commissioner T. B. Merry, Oregon, who had been on the ground about sixty days ahead of us. nsul-General Morgan and Honorary Assistant Commissioners John Smyth and Samuel P. Lord, residents of Melbourne, had rendered bstantial aid and assistance. A few days after our arrival the Com- ssion was called together and the preparation of reports on the dif- ent exhibits was assigned to each. To me was given "Tobacco." I s instructed by you to take observations and report fully upon this bject.

I now have the honor to submit my report as follows:

VICTORIA.

The city of Melbourne, where this Exhibition is being held, is the ncipal city of Australia, and largely controls the trade of Australia, smania, and New Zealand. Its population is over 400,000. It is the lroad and steam-ship center of Australia, and in every way the best nt from which to introduce manufactured articles to Australia.

Australia, now celebrating its centenary, had in 1885 a population of 00,000 inhabitants, who probably enjoy a more general prosperity n any other people. This is demonstrated by the extent of their merce. In 1885 their imports from Great Britain alone amounted 160,000,000. Compare this with the exports of Great Britain to the ited States, France, and Germany in the same year, amounting to

$265,000,000, and it will be seen that Australia imported per head of population twenty-three times as much as the above-named countries combined. In addition, Australia is a large buyer from Europe, China, India, and the United States. There are 9,200 miles of railroad in operation and 3,600 miles being constructed. It is a fertile country, rich in fruits and cereals; the mineral wealth is enormous; and it is one of the leading grazing and stock-raising countries of the world.

Tobacco occupies a very important place in the customs revenue of Victoria, as the statement given below will show:

Return showing the quantity and value of tobacco, manufactured and otherwise, imported into Victoria from January 1, 1884, to December 31, 1887.

Kind.	Quantity.	Value.
1884.	*Pounds.*	
Manufactured	1,461,533	£110,059
Unmanufactured	402,286	29,589
Cigars	208,004	76,763
Cigarettes*	.....	.....
Snuff	3,864	898
1885.		
Manufactured	1,833,909	142,372
Unmanufactured	450,121	27,418
Cigars	212,335	71,867
Cigarettes	17,077	9,011
Snuff	5,011	1,178
1886.		
Manufactured	1,950,096	157,699
Unmanufactured	792,965	28,954
Cigars	216,332	95,508
Cigarettes	16,942	8,658
Snuff	4,155	965
1887.		
Manufactured	1,919,483	148,939
Unmanufactured	384,224	21,949
Cigars	151,155	68,736
Cigarettes	28,445	11,722
Snuff	5,103	1,080

* Included in cigars.

Accompanying the above statement was a very pleasant letter which will show the perfect accuracy of the figures given, as it comes direct from the chief inspector; as follows:

DEPARTMENT OF TRADE AND CUSTOMS,
Victoria, September 10, 1888.

DEAR SIR: I have much pleasure in complying with your request and trust that the return attached will give you all the information you require. Should you be leaving Australia and will send me your address I will be happy to furnish you with the return for 1888 when compiled and published.

Very truly yours,

A. HAMMOND.

R. L. MILLER, Esq.

Thinking that the quantity and quality of tobacco raised in each colony would be of interest to American tobacco-growers, with a few remarks on the probable future effect it will have on our exports, of which will have more to say farther on, I wrote to the secretaries of each of the colonies and now give their replies. My first letter, dated August 5, was addressed to George T. A. Lavater, Secretary of the Exhibition. His reply was as follows:

[Centennial International Exhibition, Melbourne, 1888.]

66.] EXHIBITION BUILDINGS,
Melbourne, August 10, 1888.

SIR: I have the honor to acknowledge receipt of your letter of the 9th instant, king for information relative to the growth of tobacco in this colony, and, in reply, beg to inform you that your letter has been forwarded to the secretary for agriculture.

I have the honor to be, sir, your obedient servant,

GEO. T. A. LAVATER.
Secretary.

R. L. MILLER, Esq.,
Assistant Commissioner for the United States,
Centennial International Exhibition, Melbourne.

On the 15th instant I received the following letter from Mr. Lavater, inclosing one from D. E. Martin, Secretary for Agriculture for Victoria, both of which will be found of interest and are as follows:

[Centennial International Exhibition, Melbourne, 1888.]

74.] EXHIBITION BUILDINGS,
Melbourne, August 15, 1888.

SIR: I herewith have the honor to inclose you a copy of a letter received from the Department of Agriculture, dated the 14th instant, relative to the inquiry you addressed to me with respect to the growth of tobacco in this colony.

I have the honor to be, your obedient servant,

GEO. T. A. LAVATER,
Secretary.

R. L. MILLER, Esq.,
Assistant Commissioner for United States of America,
American Court, Exhibition.

orr. No. 40761]. DEPARTMENT OF AGRICULTURE,
Melbourne, August 14, 1888.

SIR: I have the honor to acknowledge the receipt of your letter of the 10th instant, inclosing one from Mr. R. L. Miller, one of the Assistant Commissioners for the United States, in which he requests to be informed as to the growth of tobacco in this colony. The information required will be furnished to Mr. Miller as early as possible.

I have the honor to be, sir, your most obedient servant,

D. E. MARTIN,
Secretary for Agriculture.

The SECRETARY,
Centennial International Exhibition, Melbourne.

Again, on August 23 I received a letter from Mr. Martin as follows:

Corr. No. 40761.] DEPARTMENT OF AGRICULTURE,
Melbourne, August 23, 188[illegible]

SIR: Adverting to your request for information as to the growth of tobacco in t[illegible]hin colony, I have the honor to inform you that the plant referred to is grown on [illegible] th King and Ovens Rivers and at Kiewa, in the northeastern district. Evidence on th subject of tobacco culture has been taken by the Royal Commission on Vegeta[illegible]abl Products, and will be found at pages 39 to 46, and 99 to 102 in the Third Prog[illegible]res Report; also in pages 1 to 30 of the Fifth Report. Herewith I inclose a set of the[illegible] e re ports of the commission. Additional information may be found in Hayter's [illegible] Yea Book, pp. 425 and 460.

I have the honor to be, sir, your most obedient servant,

D. E. MARTIN,
Secretary for Agricultu[illegible]re.

R. L. MILLER, Esq.,
United States Court, Exhibition Buildings, Melbourne.

By reference to reports mentioned I found a series of questions a[illegible]sked by the Royal Commission and answered by the planters from the d[illegible]ffer- ent sections of the colony, a few of which I think will be all th[illegible]at is necessary, as follows:

PETER STEWART THOMSON examined (September 8, 1887):

By the COMMISSION:

8399. You reside at Wangaratta, and are at present mayor?—Yes.

8400. What are you?—In business as a commission agent.

8401. You can give us some information about the tobacco growing in the district?—Yes.

8402. You have been a buyer?—Yes, for the last ten years.

8403. Could you give an idea of the extent of the industry—the quantity grown?—I can give the tonnage. I suppose there is about 250 tons this year—1887.

8404. This last crop?—Yes; this crop coming in for sale.

8405. That is larger than usual?—Yes.

8406. Is that the result of a better season?—Yes.

8407. Is the amount of planting increasing in the district?—No; I do not think it is.

8408. Rather the other way?—Yes.

8409. What is your opinion as to the quality?—The quality is much better this year than last.

8410. But the tobacco, generally speaking, how does it compare with other tobacco in this district?—It produces the best leaf in the colony—the King River leaf is considered the best.

8411. How would that compare with the American?—It does not compare at all with the American.

8412. Not so good?—I do not know about the leaf being so good; but the American crop, the crop coming in now, would not be shown till next year. They hold it back.

8413. Why?—The older the tobacco the better it is for manufacture; the manufacturer can not send out tobacco. It cannot be sent out right away for manufacture. It must be aged. Tobacco gets better by age.

8414. Suppose we held our tobacco back for the same length of time, how would it then compare?—That I can not tell you.

8415. It has never been tried?—No; there was one time, when Mr. Dudgeon was alive, he did think of getting all the tobacco stripped here before sending it to Melbourne; that is, taking the stem out of it before sending it to Melbourne—that is,

aking the stem out of it the same as the Americans do before they put it into hogs-eads.

8416. That would be for the purpose of keeping it a longer time?—Yes, and to save eight.

8417. It would be very interesting to know if we can produce a really good tobacco, r if it must always be inferior to the production in other countries?—I do not see hy our tobacco, if it went through the same process as in America, should not be as ood.

8418. It really has not been tested?—It has not that I am aware of.

8419. You think, at any rate, the tobacco grown here is the best grown in the col-ny?—I think so; we can always get the biggest price for it.

8420. Is there anything you could tell us that strikes you as being important in re-ard to the industry?—No; I do not think so.

8421. As to the matter you have already told us—the industry is not increasing, ather decreasing—is that to be accounted for in any way?—Well, sometimes they et very bad crops; it is a very risky crop at all times. The prices for the last four r five years have been fairly good, according to the quality of the tobacco, from 4*d.* o 7½*d.* per pound. That is for No. 1—that is the best leaf. There is No. 1, 2, and 3, hree qualities of the leaf.

8422. Does each growing produce the three crops?—Yes; that is simply as it is lassed.

8423. What would be the average class of a crop; is the No. 1 a large proportion of he crop?—The No. 1 is 75 per cent. fully, if a fair crop, but last year it was not that; ast year it was about 75 per cent. No. 2 and 25 per cent. No. 1.

8424. This year it will be good?—I think so; pretty well 70 per cent., the No. 1.)f course the crop is not in yet, but what I have seen of it and as far as I could udge.

8425. There was a manufacturing establishment here not very long ago?—Yes.

8426. That ceased to exist?—Yes.

8427. What was the cause of that?—Want of capital. You see tobacco is only in he market at a certain time, and when it is in the market you must be prepared to uy it; it is not a thing you can go into the market and buy every day; it is not like ny other business; the crop is bought; it runs perhaps two or three months; now, his present crop, there will be very little of that available by the end of January.

8428. And the company had not sufficient capital to carry on that way?—Cer-ainly not.

8429. It is stated by some growers that the high license that is paid for manufactur-ng has had the effect of reducing the number of factories to just a few in Melbourne nd closing all the country factories?—There was never but one country factory that knew of—the one that was here.

8430. That is stated—that a number of country growers manufacturing their own obacco were stopped by the high license.—Yes, I have no doubt of that.

8431. And that has been prejudicial to price, on account of the buyers being re-uced to three or four; a ring being formed has kept the price down; have you any ews on that?—I feel certain there is no ring.

8432. No combination amongst the buyers?—No, because we buy tobacco here, and ears gone by the tobacco was sent to Melbourne and sold on commission. I have old good tobacco (tobacco that I have paid 7½*d.* a pound for here) on commission at *d.* and 5*d.* a pound. That is within the past ten years. That was before any duty as on tobacco at all. Now we have as much trouble with the manufacturers in elbourne in buying—as much bartering as we had in buying from the growers; so feel certain there is no ring.

8433. You think, then, that whatever effect the license has, it does not lower the rice to the grower?—I do not think so. My reason for saying that is, I have seen obacco at 4*d.* and 5*d.* a pound before there was any duty on it; they sold it at that.

8434. That is good tobacco?—Yes, certainly; I have given 7½*d.* a pound for it at the stores here.

8435. Do you know what the Melbourne manufacturers give for the American leaf?—It, too, varies in price, just the same as ours.

8436. Does it run up to something like 2*s.* 6*d.*?—It runs to more than 2*s.* 6*d.*; there is 2*s.* a pound duty on the American leaf.

8437. You say you think it is decreasing; is there any cause for that?—There are a great many going out of it; going into other things; into safer crops. Tobacco is not a safe crop at any time. To-night you may have a fine crop, as fine as you could see growing; the frost comes, and next morning it is not worth a snap of the fingers.

8438. Do you think there is any room for the expansion of this line of business?—Well, it is very limited; the output of colonial leaf this year is a great reduction to what it was last. The customs duties paid by the manufacturers is a long way short—some thousands of pounds—of what it was. The Melbourne manufacturers say the American tobacco is taking the place of the colonial.

8439. Here is a list of the growers in this district last year [showing it to the witness]; you are pretty sure there is a decrease in area, from your experience?—Yes.

8440. Do you think there is anything that can be done to encourage or foster this industry?—A great many think that if this £150 license were reduced, it would do a lot of good.

8441. Does it not show that there is still room for more?—You see it is the capital that is required to start it. I do not think for a moment that the £150 a year would crush a tobacco factory if they had the capital to go on with. We had a very large tobacco factory started in William street, Melbourne, that only lasted about twelve months.

8442. You do not think that the limiting of manufacturing depreciates the value?—If you had more buyers, of course there would be more competition.

8443. Would there be more competition with more colonial leaf manufactured?—Our colonial tobacco does not take well now; the American is taking the place of it, which the customs returns will show.

8444. Is there any reason why we should not grow tobacco similar to the American?—I do not know of any reason.

8445. If the growers were allowed, by means of a cheap license, to manufacture their own, we are told they would obtain a sale, and thereby encourage the consumption of the colonial article.—I do not think that has ever been tried. I know a few that made tobacco, and made it very well. I never heard of much consumption of colonial tobacco.

8446. They must have sold it somewhere?—Yes.

8447. Is there anything else you would like to tell us about?—No; I think not.

8448. Can you suggest any means by which this industry may be encouraged or fostered?—No; I could not suggest any means that is in our power to make it better.

The reports from the other witnesses being very similar, I will not give them. This witness seems to be quite intelligent. However, I must disagree with him in one very vital point. He says he thinks as good tobacco can be grown in Australia as in Virginia. From my observation I am certain this is not so. Tobacco requires heavy and constant dews to make it of fine flavor and give it body or substance. This it can never have in any part of Australia. The nearest approach to this is condition is the section of country near Auckland, in New Zealand, of which I will say more later on.

In 1886 Victoria had under cultivation in tobacco 1,866 acres, which produced 1,538,200 pounds, and in 1887 there was a little over 2,000 acres, which produced 1,350,000 pounds.

Hayter's Year Book, 1886–'87, says:

At a very early period of the colony's history it was the custom of the pastoral occupiers of the soil to cultivate tobacco in small quantities for the purpose of making a decoction wherein to dip their sheep for the cure of the disease called "scab"; that complaint has ceased to exist amongst the Victorian flocks; but of late years tobacco has been grown for the purpose of manufacture into an article suitable for the use of man. Two thousand and thirty-one acres were placed under it in 1886–'87, and the yield amounted to 12,008 cwt.

Although more land was placed under tobacco than in any previous year, the quantity raised was exceeded in 1885–'86, when 1,866 acres produced 13,734 cwt., and in 1880–'81, when 1,990 acres produced 17,333 cwt.

The consumption of tobacco in Victoria during the last two years has been rather over 1¾ (1.69) pounds per head of the population, which, according to the following figures, which have been partly derived from a paper read by Dr. O. J. Broch before the Statistical Society of Paris, on the 15th of June, 1887, is a lower average than that prevailing in any of the following countries except South Australia, Italy, and the United Kingdom. Attention is called to the very high average consumption of tobacco in Holland and the United States of America.

Average annual consumption of tobacco per head in various countries.

	Pounds.		Pounds.
Holland	6.92	Norway	2.29
United States	4.40	France	2.05
Austria-Hungary	3.77	Sweden	1.87
Denmark	3.70	Tasmania	1.85
New South Wales	3.53	New Zealand	1.75
Queensland	3.49	Spain	1.70
Western Australia	3.26	Victoria	1.69
Switzerland	3.24	United Kingdom	1.41
Belgium	3.15	Italy	1.34
Germany	3.00	South Australia	1.32

With the above remarks I will now close my report on Victoria and will take up New South Wales as next in order.

NEW SOUTH WALES.

A letter addressed to the secretary of agriculture of New South Wales elicited the following from Mr. James Powell, the collector of customs at Sydney:

CUSTOM-HOUSE, *Sydney, August* 27, 1888.

SIR: I have the honor to acknowledge the receipt of a letter dated the 13th instant, directed to the chief secretary, applying for information regarding the tobacco industry of New South Wales.

In reply I beg to inform you that the latest and best information on the subject of tobacco manufacture in this colony is published in a work by Mr. G. W. Griffin, United States consul in Sydney, entitled "New South Wales, her Commerce and Resources."

I have the honor to be, sir, your obedient servant,

JAMES POWELL,
Collector of Customs.

R. L. MILLER, Esq.,
Assistant Commissioner, United States Court, Exhibition, Melbourne.

I procured the book suggested by Mr. Powell, and found it very thorough. It has proved of great service to me in preparing this report. Many facts and figures contained herein are from Mr. Griffin's book, "New South Wales, her Commerce and Resources."

Tobacco has been grown in Australia since 1826, but in spite of this the industry has been one of slow growth, and the results so far attained appear rather unsatisfactory. The total product of the whole island continent in 1886 was only 5,000,000 pounds, of which nearly one-half was grown in New South Wales. Victoria is second in importance in the culture, with a product of about one-half the former colony. The difficulties attending the growth of the weed appear to be twofold. An analysis of the tobacco shows an excess of silica and a smaller quantity of lime and potash than is contained in American (Virginia) tobacco. Another defect is the extremely dry climate in the fall, rendering curing unsatisfactory. The use of fertilizers is almost unknown, and even where used the results are of little value. The result is that the soil is worn out where tobacco is planted any length of time; the regions once largely producing no longer cut any important figure. The preeminence of New South Wales in tobacco culture is largely due to the soil, in certain sections of the colony, being composed of decomposed volcanic matter containing large quantities of the minerals upon which the plant feeds. The planting time differs somewhat from the same season in this country, because of Australia being south of the equator. The seed is planted in May and June. The plants are set out in July, August, and September, and the crop is harvested in March and April. The main difference in the methods of cultivation of Australian and American tobacco lies in the curing, which is of a crude and unsatisfactory character. The price of tobacco has been affected by the general advance in all the other markets of the world. The New South Wales duty on foreign tobacco is 73 cents per pound, except when imported for manufacturing, when the duty is only 24 cents per pound. An increased amount of colonial tobacco is being used, owing chiefly to the low price asked in comparison with the foreign article. In addition to the import duty there is an excise duty on the domestic manufacture of 30 cents per pound. Of 2,044,000 pounds of tobacco manufactured in 1886 in New South Wales, more than three-fourths was colonial leaf.

IMPORTATION OF TOBACCO (NEW SOUTH WALES).

The total quantity of all kinds of tobacco, cigars, cigarettes, and snuff imported into the colony of New South Wales during the year 1886 was 2,253,497 pounds, valued at $1,104,480, against 1,831,386 pounds, valued at $923,210, for 1885, showing an increase in quantity of 422,111 pounds, and in value $181,270 for 1886. Of the imports for 1886 there were 1,387,036 pounds of manufactured tobacco, valued at $475,590, and 507,916 pounds of unmanufactured valued at $161,840;

cigars, 310,694 pounds, valued at $374,760; cigarettes, 46,923 pounds, valued at $91,325, and snuff, 928 pounds, valued at $96b. The increase consisted principally in manufactured tobacco, which showed an increase of 428,963 pounds in quantity and $130,014 in value. The unmanufactured or leaf tobacco declined from 516,951 pounds in 1885 to 507,916 pounds in 1886. Cigars declined during the same period from 317,995 pounds to 310,690 pounds. Cigarettes, however, increased from 40,593 pounds in 1885 to 49,923 pounds in 1886, and snuff 770 pounds, to 928 pounds.

The bulk of these imports consists of American tobacco, the unmanufactured being almost exclusively the product of that country. The actual quantity of American tobacco consumed in the colony does not show in the returns, for a considerable proportion is shipped by way of London, and is entered as British produce. The direct shipments from the United States during the year 1886 amounted to 1,083,852 pounds, valued at $346,695, against 846,815 pounds, valued at $249,660 for 1885.

It must not be inferred, however, that all the tobacco entered at the customs here is consumed in the colony, for no inconsiderable proportion is re-exported. During the year 1886 the total quantity of all kinds of tobacco exported from the colony amounted to 632,893 pounds, valued at $299,810, against 810,906 pounds, valued at $361,895, for 1885. The whole of the exports of 1885 consisted of foreign produce, but in 1886, 576 pounds of colonial leaf, valued at $245, were exported. Of the exports of foreign tobacco for 1886 Victoria received 88,548 pounds, valued at $52,350; New Zealand, 21,702 pounds, valued at $14,413; Queensland, 232,278 pounds, valued at $122,360; New Caledonia, 85,772 pounds, valued at $31,260, and the remainder to Tasmania, South Australia, Western Australia, Fiji, and the neighboring islands.

The duties levied on tobacco imported into the colony during 1886 were, on the manufactured article, 3*s.* per pound; on tobacco for manufacturing purposes, 1*s.* per pound; on the leaf, 3*s.*; and on cigars and cigarettes, 6*s.* The excise on tobacco made in the colony was 1*s.* per pound, and on cigars, 2*s.* 6*d.* The excise duty on manufactured tobacco was, however, increased during 1887, and now stands at 1*s.* 3*d.* The following table shows the amount of revenue obtained during the last ten years from the import duties on this article:

Revenue derived from import duties levied on tobacco, etc.

Year.	Manufactured.		Leaf.		Unmanufactured.		Cigars.		Cigarettes.	
	Duty per lb.	Amount collected.	Duty per lb.	Amount collected.	Duty per lb.	Amount collected.	Duty per lb.	Amount collected.	Duty per lb.	Amount collected.
	s. d.	£	*s. d.*	£	*s.*	£	*s.*	£	*s.*	£
1877.....	2	23,251	1	57,483	.....	(*)	5	21,798	.....	.....
1878.....	2	26,114	1	58,211	.....	.....	5	24,602	.....	.....
1879.....	2 / 2 6	27,236	1 / 1 3	58,326	.....	.....	5	27,597	.....	.....
1880.....	2 / 2 6	24,824	1 / 1 3	43,555	.....	.....	5	29,017	.....	.....
1881.....	2	30,672	1	56,269	.....	.....	5	39,886	.....	.....
1882.....	2	31,113	1	52,762	.....	.....	5	44,782	.....	.....
1883.....	2	33,411	1	41,739	.....	.....	5	53,744	.....	.....
1884.....	2 / 2 6 / 3	44,248	3	15,889	1	†15,361	6	58,984	6	4,064
1885.....	3	50,240	3	1,567	1	33,624	6	65,889	6	8,962
1886.....	3	56,802	3	1,326	1	28,076	6	67,058	6	11,741

*Included with leaf. † Part included with leaf.

Excise duties were first levied on tobacco manufactured in the colony in 1884, and the amount collected since then has been—

1884	£68,000
1885	106,658
1886	102,212

The revenue derived from cigars has been trifling, in no year reaching 1,000 pounds; thus—

1884	£490
1885	863
1886	667

It will be seen from the table given above that the revenue derived from the imported leaf has steadily declined, its place being supplied by leaf grown in the colony. To meet this falling off, the alteration in the excise duty levied on colonial-made tobacco entered for home consumption was increased, as already stated, to 1*s.* 3*d.* per pound. As the American leaf was subject to a duty of 1*s.* per pound, were this leaf used exclusively in the manufacture of tobacco in the local factories, the actual duty paid on the finished product would have been, previous to the alteration in the tariff, 2*s.* per pound, as against 3*s.* for the imported article. Such, however, is not the case; large quantities of locally-grown leaf are used, and the absolute amount of duty paid on the tobacco made in the colony was 1*s.* 3¾*d.* in 1885, and 1*s.* 3¼*d.* in 1886.

I will close my report on New South Wales with a short description of the soil and climate suited to growth of tobacco, giving quantity produced and where the most of it is raised.

Both the soil and climate of the colony of New South Wales are well fitted for the growth of the tobacco plant. Tobacco, however, demands

· its proper cultivation special knowledge on the part of the growers, d is not for this reason so largely cultivated as would otherwise be e case.

In the year 1862, the first shown in the subsequent table, there were ly 224 acres under cultivation, producing 2,467 cwt. of leaf tobacco. the following years, however, the area had largely increased, chiefly the agricultural districts of Argyle and the Hunter River Valley. ice then the growth of tobacco seems to have been almost entirely andoned in the districts where it was first attempted, but it has read to other parts of the colony, the Murrumbidgee Valley and mut being now the principal producers. More than a third of all e tobacco grown in the colony is obtained from the latter district. The growth of tobacco is chiefly in the hands of Chinese, few Euro-an agriculturists seemingly being sufficiently skilled in its cultivation .d the preparation of the leaf.

EXTENT OF LAND UNDER TOBACCO CULTIVATION (NEW SOUTH WALES).

During the last ten years the area devoted to the cultivation of bacco has averaged more than three times the amount of that during e previous ten years, and it is a noteworthy fact that the quantity of lonial leaf used in the colony now amounts to three-fourths of the al consumption.

The following table shows the progress of the industry during the t quarter century:

Cultivation of tobacco.

ar ended rch 31—	Area.	Production.	Year ended March 31—	Area.	Production.	Year ended March 31—	Area.	Production.
	Acres.	*Cwt.*		*Acres.*	*Cwt.*		*Acres.*	*Cwt.*
.....	224	2,467	1871.....	225	700	1880.....	592	6,221
.....	896	15,315	1872.....	567	4,475	1881.....	1,791	19,469
.....	534	4,851	1873.....	440	2,751	1882.....	1,625	18,311
.....	867	4,036	1874.....	199	1,261	1883.....	1,815	17,540
.....	1,499	7,469	1875.	539	6,069	1884.....	1,786	20,006
.....	1,326	2,478	1876.....	491	4,098	1885.....	1,046	9,914
.....	627	6,035	1877.....	333	2,440	1886.....	1,603	22,947
.....	875	7,925	1878	399	3,049	1887.....	1,203	13,642
.....	366	3,192	1879.....	835	7,932			

NEW ZEALAND.

Although probably the best adapted of any portion of Australasia the raising of tobacco, yet, owing to the excessive duty, it is almost il" in production. A factory on quite a large scale was started at ckland some four years ago by a Mr. Valbracht. He distributed d and offered to pay liberally for the leaf, but he met with little ouragement from the farmers, and as the duty on the manufactured icle from home-grown leaf was as high as that on the imported arti-e he was soon forced to abandon his enterprise.

I quote two extracts from the tobacco laws showing how the home-grown tobacco is hedged around:

Extracts 17 *and* 18 *from an act to allow tobacco to be manufactured in bond, passed by the New Zealand parliament December*, 1879.

17. All tobacco grown in the colony and prepared for sale shall, when it passes out of the possession of the occupant of the place or premises upon which it is grown, be carried by the shortest or usual route directly to and deposited either in a licensed bonded tobacco manufactory and entered in the stock book of the manufacturer, or in a customs bonded warehouse, where it shall be duly warehoused in the same manner and under the same conditions as are provided by the said act with respect to imported tobacco.

18. All raw tobacco grown in the colony not warehoused or deposited as herein required, and removed from the place or premises whereon it was grown, and in the possession of any person other than a licensed tobacco manufacturer, except only for the purpose of carrying or conveying it directly to some licensed bonded tobacco manufactory or to a customs bonded warehouse, the proof whereof shall lie on the person having possession thereof, shall be seized, and shall be and remain forfeited to the Crown.

There are now two small factories in all New Zealand. The Maoris at one time cultivated tobacco quite extensively, but as soon as outside stock commenced to come in pretty freely they preferred to buy rather than work the crop. The Maori name for prepared tobacco is "Turodi." The North Island is best adapted for the growth of tobacco, owing, I think, to the very heavy dews, and the soil being light, mixed with sand. A letter to the secretary of agriculture brought out the following facts:

NEW ZEALAND, COLONIAL SECRETARY'S OFFICE,
Wellington, September 7, 1888.

SIR: I have the honor to acknowledge the receipt of your letter of the 13th o[illegible] August, asking for information regarding the tobacco industry in New Zealand.

In reply I have to state that the area under cultivation in tobacco last year, a[illegible] given in the statistics, was 20 acres. This was sown with seed imported from Americ[illegible] and is in the Hawkes Bay district. Samples of the leaf grown from that seed we[illegible] sent to Cameron & Co., of Sydney, for examination and report as to quality. It w[illegible] sent through the agricultural branch of the Crown lands department at the instan[illegible] of Mr. Frederick Fulton, of Napier; but no answer has been received from Mess[illegible] Cameron.

In addition to the 20 acres referred to above, there is reason to believe that sm[illegible] quantities of tobacco have been grown by various persons as an experiment, wh[illegible] the Maoris in the North Island have for years past grown and prepared tobacco [illegible] their own consumption.

There are two tobacco factories in the colony, one at Auckland and the other [illegible] Dunedin. The former belongs to the Atlas Tobacco Company. During the half y[illegible] ended the 30th of June last it used 8,554 pounds of New Zealand-grown leaf and 12,[illegible]13 pounds of imported in the manufacture of cigars and tobacco. The latter is ow[illegible] by Hong Sing, and during the same period used 2,109 pounds of New Zealand-gro[illegible] leaf and 1,000 pounds of imported.

I trust these particulars will be of use to you, and I regret that no further infor[illegible] tion is available.

I have the honor to be, sir, your most obedient servant,

G. S. COOPER,
Under Secretary.

R. L. MILLER, Esq.,
Assistant Commissioner, United States Court, Exhibition Buildings, Melbourne.

I spent several hours a day for several days in the New Zealand Court. The few samples of tobacco I found showed very good color and texture, but were quite deficient in flavor and quality. I addressed a letter to the Executive Commissioner asking for any information he could give me, with the following result:

NEW ZEALAND COURT, CENTENNIAL INTERNATIONAL EXHIBITION,
Melbourne, August 11, 1888.

DEAR SIR: In reply to your letter of 9th instant requesting information as to the growth of tobacco in New Zealand, I beg to inform you that the plant has been long grown there, and evidence taken by a special commissioner of inquiry clearly established the fact that any quantity can be produced, and that there is no reason why the whole of the tobacco consumed in the colony should not ultimately be produced and manufactured in it. In the South Island, the tobacco grown is of strong description and used for insecticidal purposes, while in the North Island the tobacco is of a finer quality, and is cultivated by the Maoris for their own use.

I find by the latest accounts at hand that in 1884, the tobacco grown in New Zealand for manufacture was 4,776 pounds; and in the same year the sum of £200,884 was paid as duty on imported tobacco; which at 3*s.* 6*d.* per pound would represent about 921,000 pounds; also 69,295 pounds of cigars and 23,311 pounds of cigarettes were imported. It is stated that the effect of the existing tariff in New Zealand is to discourage the cultivation of tobacco in any large quantity, although the excise duty is only 1*s.* per pound. It is believed the tobacco act of 1879 was deliberately adopted for fiscal reasons on the recommendation of the customs department, a revenue from this source being preferred to encouraging the cultivation of home-grown tobacco; otherwise there is no doubt tobacco growing would take its proper place in the list of New Zealand industry.

I have the honor to be, dear sir, yours truly,

JAMES HECTOR,
Executive Commissioner for New Zealand.

R. L. MILLER, Esq.,
Assistant Commissioner United States Commission.

I am greatly indebted to Mr. J. Young, Secretary of the Auckland Chamber of Commerce, for the annexed statistical report of the imports and exports of tobacco, cigars, cigarettes, and snuff into and from New Zealand for the year 1887, with which I close this chapter:

Exports from New Zealand, 1887.

Articles and countries to which exported.	Quantities.	Values.	Articles and countries to which exported.	Quantities.	Values.
Tobacco (manufactured):	*Pounds.*		Tobacco (manufactured)—Continued.	*Pounds.*	
United Kingdom	2,281	£161	Mauritius	141	£9
Victoria	25,029	1,605	United States:		
New South Wales	8,742	517	On east coast	347	26
Queensland	1,334	124	On west coast	100	6
South Australia	186	10	Brazil	22	3
Tasmania	53	2	Chili	197	13
Norfolk Island	2,901	177	Peru	82	5
Fiji	2,104	139	Guam	55	5
Bengal	262	22			

Exports from New Zealand, 1887—Continued.

Articles and countries to which exported.	Quantities.	Values.	Articles and countries to which exported.	Quantities.	Values.
	Pounds.			*Pounds.*	
Tobacco (manufactured)—Continued.			Cigars—Continued.		
New Caledonia	42	£2	New Caledonia	5	£
South Sea Islands	20,065	1,109	South Sea Islands	629	28
Total	63,943	3,936	Total	3,728	1,14
Cigars:			Cigarettes:		
United Kingdom	376	87	Queensland	378	9
Victoria	1,472	434	Norfolk Island	2	1
New South Wales	1,078	273	Fiji	65	28
Queensland	2	1	South Sea Islands	63	3
Fiji	146	62	Total	508	158
United States:			Snuff:		
On east coast	4	1	United Kingdom	100	25
On west coast	7	3	Victoria	219	11
Chili	9	1	Total	319	36

Imports into New Zealand, 1887.

Articles and countries whence imported.	Total.	Value.	Articles and countries whence imported.	Total.	Value.
	Pounds.			*Pounds.*	
Tobacco (unmanufactured):			Cigars—Continued.		
United Kingdom	9,281	£543	Hong Kong	108	£30
New South Wales	2,030	132	Bengal	31	5
Victoria	297	30	Bombay	5	1
Total	11,608	705	Madras	43	7
Tobacco (manufactured):			Singapore	320	96
United Kingdom	310,347	18,893	Germany	2,700	1,107
Queensland	52	3	Belgium	509	.....
New South Wales	16,226	1,233	United States:		
Victoria	121,779	9,020	On east coast	356	320
South Australia	512	52	On west coast	339	197
Fiji	7	1	Philippine Islands	5,180	723
Hong Kong	654	39	Total	40,095	13,081
Bengal	578	38	Cigarettes:		
Belgium	21	2	United Kingdom	9,949	2,932
United States:			Victoria	136	60
On east coast	492,997	30,349	Malta	304	83
On west coast	10	2	United States:		
China	688	40	On east coast	17,821	5,246
South Sea Islands	78	4	On west Coast	254	114
Total	943,949	59,676	Philippine Islands	375	120
Cigars:			Total	28,839	8,555
United Kingdom	5,534	2,035	Snuff:		
Queensland	5	2	United Kingdom	2,690	354
New South Wales	6,040	1,366	Victoria	255	32
Victoria	18,925	7,082	Total	2,945	386

TASMANIA.

The island of Tasmania is situated in the southern hemisphere, between the parallels of 40° 33′ and 43° 39′ south latitude, and between the meridians of 144° 39′ and 148° 23′ east longitude, and corresponds nearly with Southern France and Northern Italy in northern latitude. It is irregularly heart-shaped, and occupies an area of 26,215 square miles. It is bounded on the north by the shallow and narrow Bass's Strait, which separates it from the southeastern extremity of the continent of Australia; while on its western, southern, and eastern sides its shores are exposed to the roll of the great Southern Ocean.

The island is most favorably situated as regards climate. Its position in the southern hemisphere gives it nearly the same advantage as regards immunity from extremes of temperature as that afforded to Southern France and Northern Italy in northern latitude. It is alike free from the extremes of heat as in South Australia, Queensland, and New South Wales, and the extremes of boisterous cold weather, as in the more southerly portion of New Zealand.

Although for a great part composed of elevated table-lands, its surface is broken in many places by bold mountain passes; and its broad plains and valleys in the northeastern, northwestern, and southeastern part of the island—where settlement of population has taken place—afford an exceptionally genial climate.

The appearance of the island throughout is wonderfully beautiful, with its open plains bordered by mountain tiers: its isolated peaks and wooded ranges covered with the prevailing gum-trees; and its many fine rivers and extensive lakes. Its coasts, for the most part, especially towards the south, are bold and indented with numerous bays (notably the estuary of the Derwent, where Hobart, the capital, is situated), affording ample shelter and safe anchorage for ships.

In the Tasmanian Court I saw almost every species of the grass, vegetable, and grain families, in fact everything except what I most wished to find, tobacco. In a conversation with one of the Commissioners I learned that the "weed" was grown in the island and he promised to write to a grower for the information I wanted. A few days later he handed me a letter, part of which will be found below:

ST. JOHN STREET, LAUNCESTON,
August 15, 1888.

MR. FRANK G. DUFF,
Tasmanian Court, Melbourne Exhibition:

DEAR SIR: Your somewhat lengthy letter with regard to tobacco and its culture duly to hand and contents noted.

(1) We cannot grow two crops from one root here in Tasmania.

(2) Scottsdale and Ringarooma are the most favorable places for growing the leaf I know of. You must avoid the early frosts, such as prevail at Deloraine and other places in the westward; and you must avoid, too, being too close to the sea-board or too close to the salt water.

(3) There is no failure to grow tobacco in Tasmania, as it can be grown plentifully enough, provided the quality was there.

(4) Tasmanian-grown tobacco, with the exception of that grown at the places named above, contains either too much moisture (owing to the shortness of the summer season) or too much saline matter if near the sea, or if in contact with sea breezes.

(5) There is no excise duty; no license has to be paid to government; and there is consequently no governmental supervision. They impose a duty of 3 shillings on unmanufactured American leaf; whether all stalks or all leaves—no matter to them—they want 3 shillings duty.

I wrote to the government some time ago asking for a reduced rate on imported unmanufactured leaf, but they thought it would seriously interfere with the revenue were they to reduce the duty. I gave up the tobacco business because I was appointed agent for the Melbourne firms over here, and could not properly look after it. With my experience now of tobacco culture and manufacture in Tasmania I could make it pay.

In conclusion, I may state I was the first of my countrymen to grow tobacco in [illegible]n Victoria, and the first to go into it here; but in consequence, among other things, of [illegible]f the action of the Australian colonies generally, our company do not feel disposed to [illegible]o open up any more industries, but confine ourselves to those which are already in ex[illegible]istence, and are profitable.

Faithfully yours,

JAMES AH COTT.

Now as to the quantity imported I fear I cannot give very accurat[illegible]te figures but can closely approximate them, which will do for all practic[illegible]al purposes and will be a safe guide for my countrymen should they pr[illegible]o-pose to open up trade with this island.

In the Statistical Report for the year 1885 it is stated that—

It is difficult to estimate the exact value of the exchange trade between Tasman[illegible]nia and any one country, as the values referred to in customs returns merely indicate t[illegible] the last port of clearance and the first port of entry, respectively. These values embra[illegible]race four distinct elements, viz: (1) goods actually consumed or produced by the partic[illegible]icular country; (2) unaltered re exports from or for other countries; (3) products [illegible]s of other countries increased in value by local additions or manufactures; (4) trans-sh[illegible]hipments to or from other countries. If, for illustration, we take the stated impo[illegible]orts from Victoria, viz, £722,027, we would by this process of investigation come to [illegible]o realize that (1) and (3) together represent only about 23 per cent.; (1) and (3) se[illegible]epa-rately cannot be well ascertained; (2) represents about 48 per cent.; and (4) represe[illegible]ents about 29 per cent. of the total amount stated. These proportions, however, ar[illegible]re in different years subject to much variation, according as shipments are made more[illegible]re or less between the United Kingdom and Tasmania.

Melbourne and Sydney, being the great centers of shipping, cause a large proport[illegible]tion of the trade of Tasmania and Queensland to be again included in the exports and [illegible] imports of Victoria and New South Wales.

This practice artificially increases the total nominal value of the trade of Aust[illegible]tral-asia, as the value of the same article is reckoned two or three times. The real t[illegible]rade of the colonies in the aggregate may best be roughly approximated by doub[illegible]ling the value of exports stated to be the produce or manufacture of each colony. Of course the manufactures may again include much that belongs to the produ[illegible]e of other countries; but it would be difficult to obtain a general result with any d[illegible]gree approaching precision.

The following table, taken from the statistical report, gives pro[illegible]portionally a synopsis of the general direction in which the trade of Tasmania has been moving during the years 1885, 1886, and 1887:

IMPORTS.

Country.	1885.	1886.	1887.
ited Kingdom (direct)	£695, 225	£641, 568	£435, 557
toria	722, 027	840, 977	889, 758
w South Wales	149, 329	160, 510	174, 641
ier British colonies	174, 407	93, 682	46, 501
reign countries	16, 498	19, 830	50, 360
Total	1, 757, 486	1, 756, 567	1, 596, 817

EXPORTS.

ited Kingdom (direct)	£191, 018	£247, 442	£350, 274
toria	489, 469	463, 754	436, 869
w South Wales	548, 448	555, 224	611, 229
ier British colonies	84, 758	65, 120	50, 804
reign countries	.....	.....	195
Total	1, 313, 693	1, 331, 540	1, 449, 371

turns showing the quantity and value of tobacco manufactured and otherwise imported to Tasmania during the year 1887.

Kind.	Quantity.	Value.
	Pounds.	
nufactured manufactured ars arettes	258, 295	*£14, 916 †4, 887
uff	590	

* Tobacco. † Cigars.

The places from which tobacco was imported in 1887 were the United ngdom, Victoria, and New South Wales. The kind of tobacco is not ited in the Tasmanian returns.

QUEENSLAND.

The two letters below give such a full and clear report of the tobacco oduct of Queensland that anything I might say would be only a rep- tion. I will add to this report only a short statement of the im- rts. The first is an extract from a letter from Hon. H. Courtenay ick, secretary of the Queensland Commission:

Tobacco, 1887.—128 acres under cultivation; yield, 424 cwt. of cured leaf (green f no account).

Districts: Brisbane, 1 acre; Bundaberg, 11 acres; Caboolture, 1 acre; Cairns, 8 res; Cook, 1; Logan, 1; Stanthorpe, 87 acres; Mackay, 2; Maryborough, 2; Mourilyan, 4; Toowoomba, 10.

Manufactured: 410 cwt. tobacco; 140 pounds cigars; 400 pounds snuff; two factories in Brisbane; one in Stanthorpe (Texas); one in Toowoomba.

NOTE.—The tobacco cultivation is as yet in its infancy as the above figures show. The season was also not up to the average, more especially in the central districts of the colony. Any further details I will be pleased to give you.

The subjoined letter is from Mr. Peter McLean, under secretary for agriculture, and is one of the best reports of the kind I have received; in fact nothing could be clearer or more satisfactory:

BRISBANE, *September* 11, 1888.

SIR: In reply to your letter addressed to the chief secretary asking for information relative to the tobacco industry of this colony, I have the honor to forward herewith for your information the following returns, viz:

Return showing—

Area of land under tobacco for the last ten years;

Produce per acre of dried leaf for last ten years;

Gross produce of tobacco grown in different localities for last ten years; and

Gross produce of cured tobacco for last ten years.

With reference to the statistical return I regret to state that the percentage is only an approximate one, as there is considerable difficulty in securing trustworthy returns of this industry in consequence of a great proportion of the leaf being grown by the Chinese, very few European settlers paying any attention to tobacco culture.

The general opinion of those well versed in the cultivation of tobacco is that both the soil and the climate are admirably adapted for its growth.

A small quantity is grown on the coast district in the southern portion of the colony, but the locality which has the largest area is situated above the main range about 130 miles southwest of this city.

The precarious nature of the growth of tobacco, and the quantity of labor and attention required from the time the seed-beds are formed until the time that the leaf is properly cured, is, I believe, the reason why so few of our farmers enter upon its cultivation. On the other hand, John Chinaman seems to take special delight in this kind of labor. He is out at the seed-beds in the early morning, watching the young plants, carefully tending and watering the beds, and this care and attention bestowed by him upon the plants during their life-time does not cease when the preparation of the leaf for market calls for special watchfulness.

Some of these Chinese hold special leases of land from the government, but the large proportion of them rent their land from Europeans.

There are no large tobacco plantations in this colony, the industry being yet in its infancy, but doubtless as our farmers realize that it will be to their interest to take an intelligent view of the cultivation of this plant, larger areas will be brought under cultivation.

The price for good sound leaf suitable for wrappers is not likely to be under 6*d.* per pound, but the price for good sound leaf during the last seven years has ranged from 6*d.* to 11*d.* per pound, the present price being 10*d.*

I have the honor to be, sir, your obedient servant,

PETER MCLEAN,
Under Secretary for Agriculture.

R. L. MILLER, Esq.,
Assistant Commissioner, United States Court, Melbourne Exhibition, Melbourne.

DEPARTMENT OF AGRICULTURE, BRISBANE—TOBACCO RETURNS.

Produce per acre dried leaf for last ten years.

	Cwt.		Cwt.
1878	6.84	1883	6.52
1879	7.88	1884	11.18
1880	6.50	1885	11.37
1881	7.66	1886	7.07
1882	10.57	1887	3.31

Gross produce cured tobacco for last ten years.

	Cwt.		Cwt.
1878	486	1883	360
1879	284	1884	816
1880	299½	1885	1,330
1881	521	1886	636
1882	602½	1887	424

Area under tobacco for last ten years.

	Acres.		Acres.
1878	71	1883	55½
1879	35½	1884	73
1880	46	1885	117
1881	68½	1886	90
1882	57	1887	128

Gross produce of tobacco grown in different localities in 1887.

Locality.	Cured in leaf.	Acreage.
	Cwt.	*Acres.*
Brisbane	15	1
Bundaberg	104	11
Caboolture	8	1
Cairns	16	8
Cook	7	1
Logan	4	1
Mackay	17	2
Maryborough	12	2
Mourilyan	12	4
Stanthorpe	137	87
Toowoomba	92	10

Distance and direction of localities from Brisbane: Bundaberg, 272 miles north-west; Caboolture, 31 miles north; Cairns, 900 miles north; Stanthorpe, 184 miles south west; Cook, 1,000 miles north; Mackay, 540 miles north; Maryborough, 180 miles north; Toowoomba, 100 miles west.

Although there is a considerable quantity of tobacco imported direct from the United States into Queensland, she looks for her principal supply from the other colonies, mainly New South Wales. In 1886 New South Wales sent to Queensland 232,278 pounds of home-manufactured and foreign stock, valued at $122,360. I wrote twice to the customs collector for information relating to quantity and value of imports of foreign tobacco, but regret to say I failed to get an answer covering the subject. Recently the duty on imported raw material and colonial-grown tobacco has been reduced and now conforms to the duties in New South Wales. Although this change is very recent, two firms, I learn, are arranging to start manufactories in the colony, one from Melbourne and one from Sydney. There is now a fine opening for some enterprising American manufacturer at Brisbane.

...rns showing the quantity and value of tobacco manufactured and otherwise imported to Queensland during the year 1887.

Kind.	Quantity.	Value.
	Pounds.	
Manufactured	1,145,573	£81,91[illegible]13
Cigars	65,118	16,3[illegible]34
Snuff	1,265	15[illegible]56

SOUTH AUSTRALIA.

Adelaide, the capital of South Australia, is situated on the rive[illegible]e Torrens, and surrounded by an amphitheater of hills, the highest [illegible] o which, Mount Lofty, rises 2,400 feet above sea level. The city itse[illegible]ll is one of the best laid out in Australia, being traversed by wide stree[illegible]ts lined with a superior and regular style of architecture, and an a[illegible]ab sence of hills to climb. A very pleasant feature of the city is the e[illegible]x- tensive arboriculture met with in all directions. The inhabitants a[illegible]s a rule are more English than any city in Australia, and this also appli[illegible]es to their business habits.

The climate is excellent; the temperature in midsummer is s[illegible]id not to rise over 85, nor to fall lower than 30 in winter. This wo[illegible]ld seem to indicate a fairly good country for the cultivation of tobac[illegible]co, yet last year 40 acres would cover the total area in tobacco.

The samples I saw were not at all desirable, the quality being v[illegible]ry poor and deficient in flavor. From all I have been able to gathe[illegible], I should say it is the least desirable of any of the colonies for the culti[illegible]va- tion of the "weed."

There are five manufacturing concerns in Adelaide, the three largest being branches of Melbourne and Sydney houses. To a great extent they supply the wants of this colony, hence the imports are not very large as compared with the population.

The value of tobacco (manufactured, unmanufactured, cigars, cigarettes, and snuff) imported into South Australia during the year 1886 was £42,805.

The data available at the time of the dispatch of this report prevent the possibility of giving the imports classified, but the total value is shown in the aggregate amount stated.

WESTERN AUSTRALIA.

The tobacco industry in this colony is too insignificant to require anything like an extended notice. I append herewith a letter from the Colonial Secretary at Perth, Mr. Malcolm Fraser.

The imports are small, and almost entirely from the adjoining colonies.

COLONIAL SECRETARY'S OFFICE,
Perth, August 29, 1888.

SIR: In reply to your letter of the 13th instant, asking for information regarding the tobacco industry of this colony, I have the honor to inform you that such an industry does not at present exist. At several places, however, where tobacco has been grown on a small scale it has done remarkably well, the climate and soil seeming to be particularly well adapted for its cultivation.

I have the honor to be, sir, your obedient servant,

MALCOLM FRASER,
Colonial Secretary.

R. L. MILLER, Esq.,
Assistant Commissioner, United States Court, Exhibition Buildings, Melbourne.

The value of tobacco (manufactured, unmanufactured, cigars, cigarettes, and snuff) imported into Western Australia during the year 1886 was £18,432.

The data available at the time of the dispatch of this report prevent the possibility of giving the imports classified, but the total value is shown in the aggregate amount stated.

CULTURE AND CURE.

The growing of good tobacco depends more upon the soil than upon the kind of seed which is used, and even manuring will not improve a soil much for the production of this plant, which may grow to perfection in one field and very badly in the adjoining one from the self-same seed. It is even within the mark to say that there may be three or four sorts of tobacco among the leaves of the same plant. The leaves have, therefore, to be very carefully sorted to suit the requirements of the manufacturers of the different kinds and grades of tobacco. Some of the leaves will be suitable for black plug tobacco, some for aromatic plugs, while others are only light enough and delicate enough in natural fragrance to find favor with the makers of cigarettes or the very lightest pipe tobacco. The best kind of soil for the production of tobacco is a light sandy loam containing a fair amount of organic matter. If there is too much organic matter there is a heavy crop, but coarse and deficient in aroma. The land should be well drained, and it must contain a great deal of potassium and calcium salts. Tobacco will not burn well unless it contains potassium, vegetable acids, and potassium nitrate. As tobacco removes but little phosphoric acid, and a rotation of crops is necessary for its successful cultivation, a crop of corn is usually alternated with one of tobacco. The seed-bed of tobacco should be in a warm situation and the soil of a friable nature. The young plants are transplanted seven or eight weeks after sowing, and the soil kept moist. At two months the plants flower and the buds are generally broken off, which increases the size of the leaves, but deteriorates their quality. The crop ripens in three months. The most aromatic tobacco is grown in the West Indies, which has a climate both warm and moist. The Havana cigar-leaf can be found

nowhere else in the same perfection, but in certain parts of India and Ceylon a coarser leaf of a similar kind is raised. As the Havana tobaccos are the most valuable, nearly every grower attempts to cultivate them, but the plants speedily degenerate and form new varieties. The best tobacco has a large, thin, smooth, elastic leaf, possessing a fine golden color and a good aroma. The ribs and veins should be thin. The best and strongest plants are selected for affording seed. The plants transplanted when very young develop more roots, grow more vigorously, and become more hardy afterwards than when not transplanted at this stage. Land intended to be planted with tobacco should be planted several times not less than 9 inches deep. The crop will better repay the proper preparation of the soil. The seed is put in ridges wide enough apart to permit of hoeing, weeding, and suckering without breaking the leaves.

The planting is nearly the same as with cabbages, but the plants are more tender, and they are more difficult to handle, as the roots and leaves spring from nearly the same point. After the plants have taken root they grow rapidly. They are hoed when they are 6 or 9 inches high. The ripening of a plant is indicated by the leaves assuming a marbled appearance, and a yellowish-green color. The leaves also generally become gummy, and the tops bend downwards. Snuff tobacco has to be more matured than that intended for smoking. The leaf being matured, it should be harvested only after the dew is off the plants, and in dry weather. The harvesting is done either by cutting down the whole plant, or gathering the leaves singly, which is the most profitable plan, as it enables the bottom leaves to be removed first, and the top ones remain until they have attained full maturity. This plan, however, necessitates a great deal of labor, and in a hot climate the single leaves are apt to dry so rapidly as not to attain a proper color, unless stacked early in heaps. But the stacking in heaps involves great risk of the leaves heating too much and becoming rancid. In India, therefore, the whole plant is usually cut down together. The drying shed is prepared beforehand to receive the tobacco, and it should be high enough to permit of the hanging of three rows of tobacco one above the other. The hanging is done to enable the leaves to dry slowly, and assume a good yellow color, and to slightly ferment. At the same time there must be sufficient circulation of air between the leaves to permit the moisture to gradually escape and prevent the development of ammonia and other combinations that give rise to bad flavor in the tobacco. It is necessary to alter the arrangement of the leaves so that each may receive the air in such degrees as will be most conducive to its proper decomposition.

After the tobacco is dried it is stripped, that is, the stem is separated from the leaf. It is then "cured" by being heated in various ways in order to develop color and flavor. Although it may be said that fine tobaccos generally do not require any admixture for the sake of flavor,

; the manufacturer sometimes endeavors to give them a particular
)ma. An inferior article is sometimes so much improved by artificial
ans as to compete successfully with the genuine leaf. Sometimes
)acco is steeped in a solution of sugar and hydrochloric acid. To ex-
ict the fatty matter it is macerated in alcohol or spirit of wine. To
'e a fine flavor, vanilla, rosewood oil, cassia, clove, benzoin, citron oil,
ıber, thyme, lavender, raisins, sassafras wood, saltpeter, and orange
e employed.

The best American tobacco is grown in Virginia upon a compara-
'ely small strip of country. It is useless to try and cultivate leaf of
y quality outside this strip, with the exception of the Perike crop,
ich is produced in Louisiana. This crop is, however, a very small
), and the leaf is extremely strong; far too strong for ordinary smok-
. It, however, possesses a superior aromatic flavor, and is, there-
e, very valuable for mixing purposes. The highest grades of mixed
tobacco contain 10 or 15 per cent. of Perike, which diffuses its fra-
ıce agreeably through the whole of the package. Perike is the very
ithesis of the light yellow orinoco leaf, which forms the bulk of
ıerican cut-up tobacco. It is black as "negro-head," but while the
:er has been artificially darkened, Perike is naturally as black as
t, and is never manufactured in any other way than by being dried
l cut up.

To disguise and atone for inferiority of quality in tobaccos and cigar-
es, free recourse is had to a powerful Turkish tobacco of modern
gin. When employed in small proportions only this hybrid tobacco
parts to the cigarette a decidedly pleasant aroma without the slight-
injury to the smoker. But when used in large quantities, in the
'orite attempt to impart the desired aroma to inferior tobaccos—
ıen, in fact, the cigarette may be said to be loaded with it—the effect
ıy be described as a sort of dreamy intoxication or vertigo, the
moker's mouth" in the morning, a dark deposit in the nostrils, and
urious consequences to the digestive powers and nervous system.

e history of this singular plant is curious. It owes its origin entirely
accident. Twenty years ago it was unknown, and had no existence.
t about the year 1870 the first meager crop, grown from plants trans-
ıted from one part of Turkey to another, came to light, but so crude
s it in quality and appearance as to command only a few pence per
ınd, the color being green, instead of brown, like other tobaccos.
e year following it underwent considerable improvement both in
ength and color, when it found its way to Constantinople and Egypt,
l soon came into use there. At that time the place of production
s unknown, and the venders did their best in their own interest to
p it secret. But when the truth leaked out, and tobacconists had
lized the wonderful narcotic and seductive power of the new produc-
ı, the demand for it at comparatively fabulous prices became enor-

mous. For a short time the public taste for this narcotic (at Constantinople in particular) ran wild, and no cigarette unless enormously loaded with it could find sale. The effects, however, of such indulgence soon showed themselves, and then came the petition, when ordering cigarettes from the manufacturers, "For God's sake no more of this." A tremendous reaction was the consequence for a few years, but for a few years only, when increasing competition in the tobacco trade led to its re-employment in the former large quantities. From the East the taste traveled westward, and now here in our own country we are threatened with the same pernicious effects. You should also notice the use of oils and flavorings to impart artificial aroma. These are matters which the medical profession might profitably inquire into in the public interest; for while smoking has become almost universal, few men stop to inquire as to the purity of the particular "weed" they affect, or seek to curtail the quantity consumed.

EXHIBITS IN THE EXHIBITION.

The tobacco exhibits in the United States Court are worthy of America, the home of tobacco. I think it both right and proper to give the names and brands of the firms that have gone to very great expense to exhibit their goods, and that have added so materially to the beauty of our Court and the other Courts in the Exhibition Building. This will close my report.

The well-known firm of Allen & Ginter, whose factories are in the Southern States of America, occupy with their exhibits a very large space, which is railed in and carpeted, while the tobacco, in an infinite variety of forms, is arranged with strikingly picturesque effect. The leaf department of Messrs. Allen & Ginter's factory, a huge five-storied building, is represented in the reduced size of 8 by 4 feet in tobacco leaf. There is also an accurate representation of the Globe in the same material, about 9 feet in circumference, the leading continents, islands, and seas being carefully mapped out. An imposing pyramid is built of cigarettes, and there is a cannon also constructed of the same material; while many quaint devices of leaf and plug tobacco occupy the walls. Among the smoking tobaccos will be found specimens of Old Rip long cut leaf, Imperial Bird's Eye, Richmond Mixture, Turkish Mixture, Bright Navy Chop, and other varieties. The cigarettes include Opera Puffs, Richmond Gem, Little Beauties, and Straight Cut No. 1. William Cameron & Bro., of Petersburgh, Va., furnish a fine case about 15 feet high with various kinds of smoking tobacco. The brands include the Charmer, Havelock, Peach and Honey, Venus, and the Flower of all Nations. T. C. Williams & Co., of Richmond, Va., also send various kinds of their well-known smoking tobacco, such as Golden Eagle, Yellow Bird, Imperial Ruby, Victory, Lucy Hinton, Gypsy, and Mabel Plug, with the Juno and Janus black tobaccos. Alex. Cameron & Co., of

ne city, have first-class exhibits of the like description. Good-
Co., of New York, are represented by a case of their well-known
dge cigarettes; and J. H. Maclin, of Petersburgh, Va., contributes
g tobaccos, chiefly the World's Ruler Brand. In the German
he tobacco exhibits are not numerous, but some good cigars and
tes will be found there. J. Kronheimer & Co. have a case of
in which the chief varieties are Dawn, Regalia de la Reina,
, and Conchas de Salon. W. Katz & Co., of Bruchsal, Baden,
resented by a case of various kinds of tobacco in leaf. Bier-
Schörling, of Bremen, Hameln, Loewensen, Minden, Pyrmont,
ocho, who announce that they make annually 50,000,000 cigars
hundred and twenty different brands, show a fine case containing
tion from their best manufactures. The Spain and Portugal
contains a representative collection of the famous Manila and
a cigars. Among the Manila cigars, the La Marina Cristina
high place. From Havana there are the Fanny Cerito and
de Napoles cigars. F. P. del Rio & Co. show the well-known
a Legitimas. Julian Alvarez is represented by the Havana cigar
La Flor de Henry Clay. The Compania General de Tabacos de
as, Manila, announced as the largest cigar company in the world,
good representative collection. Frossard & Co., of Payerne,
land, have a handsome case of cigars, cigarettes, and various
f smoking tobacco; and Turnbull & Somerville, of Malta, con-
a case of Kaisar-i-Hind cigarettes. The Phœnix Tobacco Works
on & Arnell, limited), established in 1853, occupy a large amount
e in the Victorian Court, and a number of hands are employed
cigars and cigarettes. Among the tobaccos shown are Exhi-
Protest, for cigarettes and pipes; White Oak, Negro-head, Curly
rd's Eye, Crow Twist, Diadem Twist, the Phœnix Virginia tobacco,
Ioss, White & Co.'s factory in Queen street is also very liberally
nted, and hands are to be seen engaged in the processes of man-
e. The Australian coat of arms, made out of cigars, attracts
on to the stand. There is a fine show-case filled with cigars of
uality, and tobaccos in great variety are shown. The Gordon
have, of course, a prominent place. Heinecke & Fox, limited, of
erican Tobacco Works, Spencer street, importers and manufact-
exhibit a fine show-case of their wares. Their leading brands of
are Zulu War, Virginian Aromatic, Royal Victor Aromatic,
dore, and Alhambra. The cigarettes are Judge's Associate,
nt Ambrosia, Morocco, and La Sultana. Exhibits from John I.
Cuban and American cigar factory, Spring street, hold a very
ent position, and the manufacture of cigars and cigarettes may
in process, while a considerable amount of raw leaf is on view.
ades Union cigars and Spanish cigarettes are a feature in the
. Messrs. Cameron Bros. & Co.'s Virginia factory, Melbourne,

is represented by a substantial case of the well-known brands of plug and cake tobacco of that firm, including Raven, Favorite of all Lands, St. Andrews, All the Rage, and Eureka. The other Melbourne exhibitors are Blashki Bros. & Co., with P. B. cigars and B. B. cigarettes; M. A. Alexander, with Federal mixture cut tobacco and flake cut; Jacobs, Hart & Co., of the Eagle cigar factory, with a fine case of cigars, and Sniders & Abrahams, with Broad End and Bona Sol cigars.

Very respectfully submitted,

R. L. MILLER,
Assistant U. S. Commissioner.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON VITICULTURE AND WINES.

By Assistant Commissioner THOMAS B. MERRY.

SOUTH YARRA, *December* 12, 1888.

R: The organization of the wine industry in the Australian colo-
is by no means as old as that of California. In 1849 Henry Gerke
Peter Lassen made wine in Tehama County, on Deer Creek, and
Raynes did the same thing a year later in Los Angeles County;
here is not any evidence to show that any wines were made for sale
be drunk outside the premises on which they were vinted. The
of California wines, as a staple article of drink, began in 1855,
Pedro Sansevain, of San José, first sent to market some sweet
called "Angelica." A few months later two Germans named
les Kohler and John Frohling produced some dry Rhenish wine
n near Los Angeles, and like to that of Sainsevain, made from
panish or "Mission grape," as it is sometimes called. The unfitness
ese grapes for anything save the distillation of brandy has long
been demonstrated beyond all dispute.

hile the wine interest of Australia is of much younger growth than
of California, it has the advantage of having been properly begun
e first place, so far as the culture of grapes is concerned. The first
s planted for wine-making were the Chasselas, from which is also
the now popular "Gutedel" of California; the Hermitage and
Riesling, both established favorites in the vintages of the Rhenish
inces; the Verdeilho and Tinturier, which had long stood the se-
st tests in the vineyards of Bordeaux; and the light Alicante,
h is as popular in California as it is in any of the Australian vine-
s. Nor is there now any evidence to show that the wine-makers of
tralia ever committed the solecism of persistently attempting to
e wines from table grapes, as did those of California from 1852 until
close of the civil war.

CHATEAUX.

le Chateau Tahbilk, owned by a corporation organized in the city
Melbourne, is situated on the Goulburn River, about 95 miles from
Victorian metropolis. It embraces about 375 acres of excellent land,
ble of being reached by steamers at least three months in the year,

ut as, after a voyage down stream of 220 miles, the steamer could nly reach Echuca, which is 172 miles from Melbourne, it will be readly seen that the river is of no assistance to the Chateau Tahbilk vineyard in getting its products to market, the railway being the shorter and the cheaper method of transportation. The dressing of the vines, the cooperage work, and all the accessories of wine-making are carried on as well as in any of the California vineyards. The chief objection to the vineyard is the flatness of the ground and the apparent richness of the soil, which has a tendency to render the wines excessively strong and heady. The best wines of the French and German vineyards are grown on hilly lands having a comparatively barren and sterile soil. The situation of the Tahbilk is most beautifully picturesque, however, and is highly commendable to its enterprising projectors. It makes about equal quantities of red and white wines, with a preponderance of dry wines over the sweet. Its Chasselas and Hermitage wines impressed me as the best of its products.

The chateau St. Hubert, owned by Messrs. Rowan & Castello, lies about 60 miles east of Melbourne, in one of the spurs of the lovely Dividing Range of mountains and embraces some 200 acres of hillside land with a southern exposure. It is amply watered by the sea fogs from July to October and therefore requires no irrigation at any season. Mr. Castello resides at the vineyard, where he is at all times in personal supervision of its work, assisted by his son. The employés of the vineyard are all Germans and French, and were conversant with vineyard work long before their arrival in the colonies. The St. Hubert produces both red and white wines and may be regarded as one of the best properties of its age on the Australian continent. I prefer its claret to any that I drank during my stay in the colonies.

These Australian wine-growers cultivate a genuine Bordeaux claret grape, while those of California use the Zinfandel, which is a Hungarian grape and makes nearer a Burgundy or Cantenac wine than a claret of the true Bordeaux stamp. Hence it is no wonder to me that the wines of Australia, especially the clarets, are lighter and have less body than those grown in California. My preferences of colonial wines are as follows: Chasselas and Riesling, Chateau Tahbilk; Claret and Hermitage, Chateau St. Hubert; Hock and Liebfrauenmilch, Mount Prior; Chablis, Adelaide vineyards; Burgundy, Yerang vineyards.

CONCLUSION.

I can not close this report without saying a word for the high spirit and commendable pride which lead the Australian wine-producers to keep their products pure and unadulterated. They seem to be working for a future reputation for their wines in striking contrast to the short-sighted California wine-producers, whose vintages can hardly be obtained in a condition of purity at the vineyards, much less at the cellars where they are sold in San Francisco. At the same time I must

omit to say that I deem it a great blunder for anybody to attempt growing white and red wines on the same land, as the soils and conditions of weather which are favorable to the one are not favorable to the other; and it would be better for each vineyard proprietor to make a specialty of that wine for which his land is adapted and confine himself to it. The markets of Europe will always afford good prices for colonial wines so long as they maintain their present degree of purity.

Very respectfully,

THOMAS B. MERRY,
Assistant U. S. Commissioner.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT ON IRRIGATION.

By Assistant Commissioner THOMAS B. MERRY.

MELBOURNE, *November* 8, 1888.

IR: Having shown in the article on "Inland Navigation" that some the Australian streams are virtually not navigable for a year at a e, and that the two largest and most useful rivers are impracticable ept from August to December, and that the Australian steam-boat- n seem loth to adopt the American methods for lifting boats and ges over the bars in low water, it may therefore be assumed that rivers of Australia are wholly inadequate to the work of carrying market the products of the country. And yet millions of gallons vater roll annually from the mountains to the sea without doing any l service or accomplishing any errand of substantial benefit to the ple.

Certainly a land so favored in everything else should not become im- verished merely for the want of water. Being comparatively useless navigation, the Darling, Barwan, Goulburn, Edwards, and Cook's ers should be devoted to irrigation; and if the products of the rray and Murrumbidgee could be carried to market by rail, and the ters of those rivers diverted into canals for purposes of irrigation, bankruptcies and other miseries arising from drought in the Aus- lian colonies could easier be averted than under present existing umstances.

But here arise two serious objections. First comes the old-time Eng- l legal doctrine of "Riparian Rights." Of course, if some enterprising n were to organize a syndicate to divert the waters of the Murray or rrumbidgee from the natural bed, some dummy or figure-head of a am-boat captain would come up and represent that his business was ng destroyed entirely by the diversion of such waters from their natu- beds, and in all probability the courts would grant him a decree in ost any sum of damages that he might ask. Australia being an Eng- l colony her courts hold tenaciously to this doctrine. The old saying t "capital is cowardly" would only find another exemplification in e futile effort to induce men of wealth either to build a system of irri- ting canals by means of incorporation and the issuance of shares of

stock, or to build the system by public taxation of all common property and the issuance of bonds similar to those on which the American transcontinental railways were constructed. With the doctrine of riparianism upheld both in England and America, as it has been since the earliest existence of law courts, going back to the very days when kings alone made laws and the bishops alone expounded them, it is quite evident that no colony desiring to introduce irrigating canals could sell her bonds in London, Paris, Frankfort, or New York, the four money centers of the world.

Again, supposing that the doctrine of riparianism were not upheld by the courts, then another obstacle presents itself. The colony of Victoria was created in 1851, and that of Queensland in 1859, both erected out of the colony of New South Wales, and in both the articles of segregation of these colonies from New South Wales it is especially stipulated that the water of the rivers that form the boundary shall be the exclusive property and under the sole control of the colony of New South Wales. As the Murray separates Victoria from New South Wales, and the Darling forms a portion of the boundary between New South Wales and Queensland, it may readily be seen that under the organic acts by which Queensland and Victoria were organized out of New South Wales, neither of them could be permitted to draw any water from those or any other boundary rivers for purposes of irrigation or manufactures, as water powers are derived in the United States of America.

And yet, what is to be done? What ought to be done? Certainly a water supply of 300,000 gallons passing any given point per hour should not be allowed to run into the sea without enriching the soil or adding anything to the staple products or material wealth of the country. If storage facilities for water could be made in the shape of large and capacious reservoirs, then the water of these rivers could be withdrawn from the channels at periods after navigation became impossible; and with the soil thoroughly enriched by irrigation, the loss of water for other purposes would be comparatively insignificant. A system of irrigating canals, leading from the principal rivers at points near the verge of the snow-belt on the mountains, with large reservoirs near the lands which it is proposed to irrigate, might be constructed under a legislative act, which could provide that no water should be taken from any navigable river after the 15th day of August until the 1st day of May in each year; and this might placate the exponents of the riparian theory until such time as it could be shown that water is more valuable for producing crops than for floating stern-wheel steam-boats.

IRRIGATION AT MILDURA.

Several years ago two Canadians named Chaffee took up a piece of desert land in the Chino valley in San Bernardino County, California, where they put in a system of ditches and flumes by which an immense *tract of* land was reclaimed and made to "blossom as the rose." These

gentlemen subsequently went to Australia and located at Mildura on the Murray River, about 36 miles above the mouth of the Darling, where they have incorporated another "irrigation colony," as they are pleased to term it, upon the same plan as the one projected by them in California, save that it is upon a much larger scale. They have already sold a large portion of this land, much of which has been disposed of in London, where a surfeit of cheap money is always awaiting the demand of any investment, however precarious; and while I do not like to condemn anything without a fair hearing, yet I am not so sanguine of the success of the Mildura settlement as are the Brothers Chaffee and most of their retainers. To begin with, this Mildura colony is about 380 miles by air line from Melbourne and about 300 from the only other available sea-port, the city of Adelaide. This is a long distance to haul fruit by rail, and, unless greater concessions to the planters and fruit-growers are made by the colonial railways in the future than have been done in the past, there will be no margin of profit left for the primary producer. Everything will be consumed in an expensive system of land carriage, having a tendency to enrich the colonial government at the expense of its citizens. Again, the Ontario colony in California was carried on by a system of distributing water by gravitation, while at Mildura the water is pumped from the river by heavy and decidedly costly machinery. Just so long as the original machinery is in working order all will go well; but when it becomes necessary to replace it and to levy assessments for that purpose, there are certain to be murmurs of discontent. Further, the hills about Mildura are now covered with a very heavy growth of eucalyptus trees, from which the pumping machinery is supplied with fuel; and when that growth of wood is cut away, and it becomes necessary to haul coal or wood to Mildura to keep the pumping engines at work, the supply of water may be diminished and a proportionate decline in the value of the lands becomes only a portion of a manifest destiny.

CONYGRAVE'S TROUGH.

Speaking of gravitation, reminds me to say that a gentleman named Conygrave, secretary of the South Australian Court at the Exhibition, perfected a most ingenious little oscillating trough for economizing water-power and still distributing the water over the land in directly opposite directions. A heavy post is driven into the ground, the flumes being erected on either side of it. Upon a rock-shaft, driven into the head of this post, is a trough subdivided in the center and shaped like an inverted letter Λ; upon the center of this Λ is a spindle, connected by an iron rod with a mandrel-shaft in a work-bench on the hillside above the trough. In this mandrel-shaft is set a circular saw. This enabled Mr. Conygrave to cut fencing pickets for fencing some 720 acres of land, and, after cutting them by water-power, to float them in flumes to such points along the line as they were needed, all with the same water which cut it into fencing timber. After the land was fenced in, the

flumes were used to irrigate the land. This appliance enabled the brothers Conygrave to utilize a stream of water of less than 14 inches in diameter, which in many of the American States would have been entirely neglected.

IRRIGATION IN IDAHO.

It would pay some of the Australian fruit-growers to visit the valley of the Boisé River in the Territory of Idaho, where the waters of the river are lifted from their natural bed, and, after being diverted at right angles for nearly 4 miles, come back into the river bed again. A canal of 7 feet in width by 3 feet in depth, having a fall of about 4½ feet to the mile, was built by the citizens, and in it upon gallows-frames of pine timber are set small paddle-wheels of from 10 to 14 feet in diameter. The force of the current in the ditch propels those wheels at the rate of seven revolutions per minute, and each paddle has at one end a bucket or box which lifts about a half-gallon of water. The wheel works undershot, of course, and as each bucket reaches a certain angle it drops its contents into a reservoir about 5 or 6 feet above the bed of the canal. This carries water into a half-dozen small spouts radiating all over the land, and enables the people to produce the most marvelous crops of fruits and cereals. It is equally feasible at scores of places along the Darling and Murrumbidgee Rivers, as well as the Edwards and Barwan; and if Australians would visit southern Idaho they would soon see how the discipline of poverty, coupled with genuine American ingenuity, has evolved a garden from a desert which, when I first saw it in 1863, could boast of nothing but sage brush, sand, and silence.

CONCLUSION.

The prosperity of Australia, in the long and advancing years when another generation shall have superseded the genial and great-hearted projectors of the grand Exhibition at Melbourne, must hinge largely upon the matter of irrigation. Australia now suffers from a blight and a drought about once in every five years, just for the want of a suitable system of irrigation. She has her countless miles of rich "chocolate" soil, and yet, rather than expend a little energy in the proper direction, allows millions of untold wealth to escape and go rolling down the river beds to the sea. She must awake to a sense of the situation and realize that as her inland navigation is wholly inadequate to the present requirements, and certain to become of less use as her population increases, she must divert her rivers into irrigating canals for at least seven months in the year and save some of that wealth of water without which her lands are comparatively devoid of value.

Very respectfully,

THOMAS B. MERRY,
Assistant U. S. Commissioner.

HON. FRANK MCCOPPIN,
U. S. Commissioner.

REPORT UPON THE PRESENT CONDITION OF AGRICULTURE IN THE AUSTRALASIAN COLONIES, WITH ESPECIAL REFERENCE TO THE GROWING OF GRAINS AND FRUITS.

By F. M. WEBSTER, *Special Agent of the United States Department of Agriculture.*

LA FAYETTE, IND., *June* 20, 1889.

SIR: For an American with but a few weeks' time at his disposal to collect material for a report on the agriculture of a country comprising rather more territory than that of his own; a country containing within its boundary upwards of 4,000,000 people, and these people endowed with the energy and push which characterize the English-speaking race, is by no means an easy matter, even though afforded every assistance by a people whose hearts beat very nearly as warmly towards the United States as towards the mother country, and given every facility that the United States Commissioner to the Melbourne Exhibition could offer me. For whatever shortcomings this report may contain I wish to enter the defensive plea of a lack of time to properly acquaint myself with the subject.

On the 26th of January, 1888, Australasia completed its first century as a part of the civilized world and, as a consequence, we should naturally expect to find agriculture still in its infancy. Besides this the Australian colonies are rich in mineral wealth, and whenever mining and agricultural interests exist together, the former is too apt to receive more than its share of attention to the detriment of the latter. How far this has proven true is not for me to say. The growth of the two cereal grains, wheat and maize, has increased from about 6,000 acres in 1795, to 3,884,360 acres in 1887. The cattle industry has grown from the 60 head in 1796, to 8,264,778 in 1887, besides 86,352,020 sheep, 1,372,756 horses, and 1,143,966 swine. In the year 1800 the white population of the colonies was something over 6,000, in 1886 it was 3,426,562. In 1881 there were 383,699 persons engaged in agricultural and pastoral pursuits. The number thus engaged in 1886 I have not been able to learn, but the product of their labors was not only sufficient to sustain the entire population of the colonies, but admit of an export of breadstuffs and fresh and preserved meats to England, amounting to £1,304,452 in value. In 1887 this was increased to £1,840,403, or $8,956,505.24. The wool product of the colonies for the year 1885 was 405,261,460 pounds, valued at £17,024,320, as against 414,532,562 pounds in 1883, valued at £21,330,381. In 1887, however, the crop amounted to 536,305,830 pounds valued at £19,787,810. These figures will serve to illustrate the fact that, as in America, wool growing has its ups and downs in Australia. It is, however, interest-

g to note that of the 1,872,000,000 pounds of wool consumed in 1887, by the manufacturing nations of the world, about 44.6 per cent. was Australasian.

At the Exhibition the display of wools was an exceedingly fine one, but the various exhibits of the cereal grains and fruits did not, as a rule, reflect credit on the various colonies, nor indeed do them full justice. The cause of this deficiency was probably due to the fact that the season of 1888–'89 was a disastrous one to the agriculturist and fruit grower on account of the generally extended and protracted drought which prevailed throughout the agricultural portions of most of the colonies. For this reason I do not feel that a report upon the condition of agriculture, as portrayed by the exhibits at the Exhibition, would truthfully indicate the real conditions as at present existing. Therefore it seems best to consider each colony as a unit, giving in each case such statistical information as I have had access to, and add to this the results of my own observations.

From the fact that, at the time of my arrival in Australia, able reports had already been prepared on some of the most important branches of agriculture, and as such reports are to be published herewith, it seem better, in order to avoid a repetition of matter, that I should confin myself to the growth of the cereal grains and fruits, referring to othe branches of agriculture only in a general way.

VICTORIA.

There appears to be little doubt that the land now embraced with the limits of this colony was first discovered by Capt. James Cook, on April 19, 1770, a few months less than six years prior to the Americ Declaration of Independence. July 1, 1851, the colony was detached from New South Wales under the name it now bears, but its constitution as an independent colony was not proclaimed until November 23, 1855. The progress of agriculture, within the area now included in the colony, from 1836 to 1855 may be indicated as follows:

Years.	Population.	Acres cultivated.	No. horses.	No. cattle.	No. sheep.	No. swine.
1836	224	50	75	155	41,332	.....
1855	364,324	115,135⅜	33,430	534,113	4,577,872	20,684

The fifty acres of land under cultivation in 1836 was devoted to wheat. The area under cultivation in 1855–'56 was devoted to the following products:

Wheat	acres.. 42,686	Mangel-wurzel	acres.. 17¼
Oats	do... 17,800	Beets, carrots, parsnips	do... 22¼
Barley	do... 1,548⅜	Onions	do... 38¼
Maize	do... 121¼	Hay	do... 40,188¼
Peas and beans	do... 84½	Green forage	do... 1,025
Potatoes	do... 11,017½	Tobacco	do... 23
Turnips	do... 355½	Vines	do... 207¼

he amount produced was as follows:

at	bush..	1,148,011	Beets, carrots, and parsnips, etc	tons..	
	do...	614,614	Onions	do...	2,9
ey	do...	45,151	Hay	do ..	83,2
e	do...	3,142	Tobacco	cwt..	3
and beans	do...	2,377	Grapes not made into wine	cwt..	4,36
toes	tons..	59,797	Wine made	galls..	9,37
ips	do...	2,909			
gel-wurzel	do...	610			

iven the foregoing amounts to a colony situated between the ty-fourth and thirty-ninth parallels of south latitude and one hun- l and forty-first and one hundred and fiftieth meridians of east longi- e, and containing, according to the latest computation, an area of 44 square miles, or 56,245,760 acres, and you have its condition, culturally speaking, in the first year of its independence. To trace rogress from 1855 to 1886–'87 would require more space than is at lisposal, and therefore we will consider only its condition from an cultural stand-point at the date last named.

Population December 31, 1886	1,003,043
Acres of land in cultivation	2,417,582
Number of horses	308,553
Number of cattle	1,303,265
Number of sheep	10,700,403
Number of swine	240,957

ie following table will indicate the acreage devoted to the several s, and the amount of product received therefrom:

Product.	Amount produced.	Acreage.
bush..	12,100,036	1,052,685
do....	4,256,079	185,765
do....	827,852	37,031
do....	231,477	4,901
do....	11,286	702
ans do....	583,269	28,672
tons..	170,661	49,974
do....	2,767	443
el do....	19,142	1,257
, and parsnips do....	4,411	467
cwt..	232,500	1,996
tons..	483,049	445,150
		284,186
tons..	1,472	204
r seeds bush..	61,490	4,667
cwt..	5,023	730
do....	12,008	2,031
do....	188,777	10,310
		970
ards (estimated value)	£551,860	27,593
		277,768

The value of pastoral produce for 1886–'87 is estimated as follows:

Milk, butter and cheese	£2,853,679	Wool	£2,791,923
Cattle	1,958,407	Swine	180,725
Sheep	1,003,162	Horses	123,440

The value of agricultural produce exclusive of dairy products and stock, for the same year, was estimated at £7,260,735. Add to this £8,911 336, the value of pastoral produce, and we have £16,172,071, or $78,703,000.72, value of the entire agricultural product the season of 1886–'87.

THE CEREAL GRAINS.

Wheat.—Although wheat growing has increased at a phenomenal rate in the colony since 1836, yet Victoria ranks only fourth among the seven colonies in point of average yield per acre. The mean average yield per acre for the years 1873 to 1886 inclusive was but 12.05 bushels. This defect is to a certain extent accounted for by the irregularity of the seasons, largely due to a lack of rain-fall—the greatest drawback that the Australian agriculturist has to contend with. Irrigation is not, as yet, carried on to a sufficient extent in Victoria to admit of general comparisons, but during the season of 1886–'87 in municipalities where it was practiced, and where the unirrigated lands produced but 10.27 bushels per acre, the irrigated lands produced 14.92 bushels per acre. From what I saw of Australian methods of agriculture, I fear, however, that there are other causes for this low average yield, and one of them is what we in America style poor farming. There is every reason for believing that if the soil was better prepared to receive the seed, a less amount per acre applied, and the seed kept more pure and unmixed with the baser varieties, a much better return would be secured. I am all the more convinced of the truth of this suspicion from the fact that both Professor Thompson in Victoria, and Professor Lourie in South Australia, under the generally prevailing meteorological conditions, and from lands not particularly adapted to wheat growing, with no experiments in view, and from quite extensive fields, have obtained yields a long way above the average of even irrigated fields.

The most promising varieties of wheat for this colony, as tested by Professor Thompson of the Agricultural Experiment Farm, are the Little Wonder, White Tuscan, Purple Straw or Farmer's Friend, Golden Drop, Rattling Tom, Du Toits, Champlain Hybrid and Steinwedel's Early Prolific. The season for sowing is properly during March and April, but dry weather often prevents sowing until May. Professor Thompson has had the best success where the seed was covered to the depth of three inches and only one half bushel of seed applied per acre. The harvest months are November and December. The work of harvesting is done either by cutting and binding the straw, or by the stripper, which beats out and collects the grain only, leaving the straw in the field.

So far as I was able to observe or learn from others, there are as yet no serious insect pests affecting the growing wheat. Rust is, however, seriously destructive to the crop during some seasons. Smut is also quite destructive, and as a preventive measure the seed is "pickled" by being dipped in solutions of water and salt, bluestone, or sulphate of copper, lime and urine, etc. While sulphate of copper is the most popular. Professor Thompson objects to it on account of its retarding the growth of the wheat in its early stages.

The twenty-six exhibits of wheat at the Exhibition were very creditable, and showed a fine plump kernel. The thirty-two varieties, one hundred and ninety-two exhibits, displayed in both straw and grain, by Professor Thompson of the Agricultural Experiment Farm, were creditable alike to that institution and to the colony which supports it.

Oats.—Although this grain is of secondary importance, as compared to that of wheat, the extent to which this statement will apply is exceedingly uncertain. A very large per cent. of the hay crop of Australia consists of oats, sown thickly, and cut and cured while in a green state. Barley, rye, and wheat are also sown either combined with oats or separately, but are of secondary value as May crops. Grass is not to any great extent, as in America, cured for hay; hence the great importance of the oat, in Australian agriculture, may be fairly well indicated, although I have no exact data of its acreage as a hay crop in Victoria as I have in Queensland, where, as will be observed, of the 10,513 acres sown in 1887, but 550 were harvested for grain.

In point of average yield per acre, Victoria ranks third, being only outstripped by Tasmania and New Zealand. The average yield per acre from 1873 to 1886 inclusive was 21.08 bushels. Where the land was irrigated there was in 1886–'87 a gain of nearly three bushels per acre over land unirrigated.

The favorite varieties are the Tartarian, Brown Potato, Cape Norwegian, and Calcutta, and are grown proportionate to the order in which they are given. The Danish and Polish varieties are also good.

The oat is the least particular of all grains with regard to soil, and will do better on newly broken lands than any of the others. For grain, two bushels of seed are sown per acre, and four where the crop is intended for hay. When sown in hay, the crop is sometimes attacked by locusts, and if sown late, and especially after a wet winter, the crop is often attacked by what appears to be a blood relative of our army-worm, but the exact species I have not been able to learn. In habit and migratory capabilities it appears to be the counterpart of our American pest.

Barley.—The requisites as to soil for this crop are almost the reverse of those for oats, in that the former requires the best and most carefully prepared ground.

Barley is sown mostly for grain for malting purposes. The mean average yield for the years 1873–1886, inclusive, was 19.83 bushels per

acre, being excelled only by New South Wales, New Zealand, and Tasmania. The grain responds very readily to the effect of irrigation; where the product on unirrigated lands varied from 16.18 bushels per acre, the irrigated land gave from 22.76 to 27.27 bushels per acre.

For malting the Chevalier is the most sown, but it is not a good milling variety. The Battle Door is a heavy yielder, as are also the Cape and Oaksholts Mellon varieties.

Rye.—This is the least cultivated of all of the cereal grains, and is mainly sown for winter grazing. In no case were the displays of this grain named at the Exhibition in Melbourne. I believe, however, it is called English rye. The yield of grain is very light, and it is not sown as much as formerly.

Maize.—From my own observation and from what information it was possible to obtain, this appears to me to be a seriously neglected grain, although the meteorological conditions to which the colony is often subjected, and lack of means of irrigation, may go far towards mitigating this neglect. Here in America this grain in various forms enters so largely into the food of both man and beast that we can hardly understand how it can be dispensed with. But we also know that dry seasons are often fatal to its growth, and that to grow it profitably the soil must be both fertile and well tilled.

The climate of the warmer portions (and in fact I think all) of the colony of Victoria is well adapted to corn culture, and the Gippsland Country is still further fitted for this grain by reason of its rich alluvial soil, which produces as much as 100 bushels per acre. So, while the lack of rain-fall is against the growing of this cereal, I can but feel that if our Australian cousins were more familiar with its manifold uses in both kitchen and barn it would form a more important element in their agriculture. In localities where the lands can be irrigated the yield is frequently more than doubled by so doing.

The following are some of the popular varieties: Yellow, White Core, Golden Drop, and Large Hard Flint. The Yellow ninety-day and Yellow one hundred and twenty-day are also grown, especially in the cooler portions of the colony. Maize is also sown to some extent for green fodder.

Hay.—As stated in the foregoing, the grasses are not generally used as hay plants in Australia. All grass hay and many of the grass seeds are, I believe, imported from New Zealand. The following results of experiments with grasses and clovers, by Professor Thompson, will, I am certain, be of interest to our farmers:

1. California Native Clover; grew magnificently.
2. Japan Clover; very little came up.
3. Bokhara Clover; grew well; a valuable deep-rooted plant.
4. White Dutch Clover; did well until hot weather came.
5. Red Clover; grew fairly well.
6. Alsyke Clover; did fairly well.
7. Cow-Grass Clover; not much success.
8. Sainfoin Clover; came up sparsely, but did well.
9. Trefoil Clover; did fairly well.
10. Ribgrass; will grow anywhere.
11. Timothy grass; did not make much progress.
12. Couch grass; did fairly well.
13. Italian Rye grass; grew 3 feet 6 inches high in three months.
14. Perennial Rye grass; did very well; heavy crop.
15. Yorkshire Log grass—heavy crop.
16. Cockfoot grass; fairly well.
17. Meadow Fescue; went off with the first heat.
18. Sheep's Fescue; not successful.
19. Red Fescue; not successful.
20. Hard Fescue; a fair plant was established.
21. Sweet Vernal; did fairly well.
22. Wood Meadow grass; not a success.
23. Creeping Bent grass; came up fairly well.
24. *Lotus villosue;* came up nicely; not suitable for district.
25. *Lotus corniculatus;* not suitable for district.
26. *Poa pratensis;* not very successful.
27. Lucern; best of all for this district.
28. Johnson grass; rough fodder plant; grows well in hot districts.
29. *Medicago tentellata;* a valuable fodder plant; grew luxuriantly.
30. *Medicago orlicculatis;* very valuable for this district.
31. *Euchlarna luxurians* (the Fosinte); did not come up.
32. *Atriplex mimmularium;* Salt Bush did well.
33. *Spartina cignosuroides* (Prairie grass); valuable fodder.

ENSILAGE PLANTS.

The subject of ensilage and the silo is attracting considerable attention throughout the colony, the following being the most popular ensilage crops: Oats, rye, barley, maize, peas, beans, vetches, lucern, variegated thistles, sorghum, broom-corn, millet, and tares.

THE RABBIT PEST.

Tame rabbits were kept in Victoria during the early years of the colony, but rabbits were first turned out upon an extensive scale by a landed proprietor in the western district. They bred rapidly, and for several years there was a demand for specimens in most districts of the colony for breeding purposes. At that time no one seems to have thought of the nuisance they might eventually become, and of the large expenditure which would be necessary to keep down their numbers. There are now few parts of Victoria which are not infested with them, although, in consequence of the vigorous efforts which have been made by the government, by shire councils, and by private individuals to suppress the evil, there are not so many as formerly. It is found, however, that if efforts are relaxed they breed so rapidly that they soon become as numerous as ever. The most successful way of destroying rabbits has been found to be poisoning, either with phosphorized oats or wheat, or with arsenic mixed with bran or chaff, or else with the fumes of bisulphide of carbon, which, being placed in their

burrows, speedily effects its object, if all the entrances are properly stopped. They are also largely trapped and shot, in which case their flesh is available for food.

The amounts expended on rabbit extermination are as follows:

1879–'80	£1,280	1883–'84	£10,063
1880–'81	2,600	1884–'85	22,177
1881–'82	12,890	1885–'86	24,833
1882–'83	9,883	1886–'87	23,531

Exports of rabbit-skins, 1877 to 1886.

Year.	Rabbit-skins exported.		Year.	Rabbit-skins exported.	
	Number.	Value.		Number.	Value.
1877	700,565	£5,790	1883	4,245,596	£30,364
1878	711,844	6,206	1884	4,963,371	37,243
1879	1,036,372	7,322	1885	3,424,259	23,548
1880	3,309,408	21,674	1886	910,609	6,800
1881	4,473,108	32,217	Total	28,704,564	208,702
1882	4,929,432	37,538			

FRUITS.

Notwithstanding the statement* that "all kinds of English fruits grow luxuriantly in Victoria," nevertheless, from the same author we learn that the colony in 1886 imported 273,133 bushels of fresh fruit, valued at £102,274, and that the excess of imported over exported fresh fruit amounted to 230,353 bushels, valued at £81,178. If these statements are correct, as I have not the least doubt is the case, the fruit growers of the colony need have but little fear of not having a home market for their produce.

Adamson's Australian Gardener, twelfth edition, 1888, recommends the following varieties of the several kinds of fruits:

APPLES.

Margaret.	Hubbard's Pearmain.	Gloria Mundi.
Irish Peach.	Prince of Pippins (Cole).	Stirling Castle.
Red Astrachan.	Rome Beauty.	Lord Suffield.
Quarrenden.	Scarlet Nonpareil.	Dumelow's Seedling.
American Summer.	Golden Harvey.	Rymer.
Pearmain.	Shepherd's Perfection.	Bedfordshire Foundling.
Gravenstein.	Lamb's Abbey Permain.	Prince Bismarck.
Ribston Pippin.	Sturmer Pippin.	Reinette de Canada.
Cox's Orange Pippin.	Keswick Codlin.	London Pippin.
King of the Pippins.	Duchess of Oldenburg.	Norfolk Beefing.
Borsdorffer.	Cox's Pomona.	Stone Pippin.
Northern Spy.	Emperor Alexander.	French Crab.
Claygate Pearmain.	Lord Nelson.	

* Handbook to the Colony of Victoria, by Henry Heylyn Hayter, government statist, Melbourne, 1885, p. 23.

PEARS.

'enne.	Beurre Rose.	Doyenne Boussoch.
armes.	Flemish Beauty.	Vicar of Winkfield.
Stuttgardt.	Louis Bonne of Jersey.	Winter Nelis.
	Thompson's.	Josephine de Malines.
	Marie Louise.	L'Inconnue.
riays.	Seckle.	Madam Cole.
on Chretien.	Beurre Clairgean.	Winter Cole.
rgamot.	Durondean.	Uvedale's St. Germains.
ıpianmont.	Beurre Berckmans.	Black Achan.

PEACH.

y May.	Yarra Noblesse.	Merri Merri.
	Kerr's Seedling.	Madeline Tardine.
s.	Royal George.	Walburton Admiral.
ımbell's.	Noblesse.	

APRICOT.

	Cambellfield Seedling.	Montgamet.
ly Peach.	Mansfield Seedling.	Moor Park.

PLUM.

Gage.	Bryanstone Gage.	Pond's Seedlings.
len.	Reine Claude de Bary.	Victoria.
.	Ickworth Imperatrice.	Diamond.
e Rouge.	Ave's Golden Drop.	White Magnum Bonum.
	Early Rivers.	Late Black Orleans.
Gage.	Early Orleans.	Autumn Compote.
	Angelina Burdett.	Belle de Septembre.
.	Mitchelson's.	American Damson.

CHERRY.

).	Early Lyons.	Bigarrean de Holland.
	Imperatrice Eugenia.	Black Tartarian.
Twyford Bi-	Bedford Prolific.	St. Margaret's.
	Bigarrean Napoleon.	Florence.

NECTARINES.

ıy.	Hardwick.	Pitmaston Orange.

QUINCE.

ıhaped variety is the most popular, although the Portugal has a fine
ı not a heavy bearer.

ORANGE.

grows well and bears freely throughout the colony, but those of the best
ɔduced in the northern districts. The following varieties are recom-
ultivation in Victoria:

lood Orange.	St. Michael's Naval or Ba-	Emperor Mandarin.
eedling.	hia.	Seville or Bitter.

FIG.

Black Ischia.	Castle Kennedy.	Negro Largo.
Brown Turkey.	De l'Archilel.	White Marseilles.

GRAPE.

The most generally useful sorts for the table are Chasselas, Frontignan, Black Hamburg, Black Muscat, Oelliade, Muscat of Alexandria.

CURRANT.

Of the black varieties the best are Black Naples, Kentish Hero, and Ogden's Black. The red varieties are Bertin's No. 9, Houghton Castle, and La Versaillaise.

GOOSEBERRY.

Crown Bud, Roaring Lion, Warrington, Billy Dean are considered best.

RASPBERRY.

Among the reds the best are Belle de Fontenay, Carter's Prolific, Fastolf, Northumberland Fillbasket, Semper Fidelis, and October Red. In yellow, Cromwell's Yellow and Yellow Antwerp are good.

STRAWBERRY.

The Edith Christy, Marguerite, Trollope's Victoria, Carolona Superba, Preminard President, La Challonaise, and the Red and White Alpine, are all favorite varieties.

Of the fruits cultivated which are not familiar to American fruit growers the following may be mentioned: The Cape Gooseberry, the Loquat, the Medlar, and the Guava.

NATURAL ENEMIES OF FRUITS.

In a valuable pamphlet treating of the fungus and insect pests attacking apple and pear trees in South Australia, the author, Frazer S. Crawford, Esq., mentions the Apple Scab (*Fusicladium dendriticum*) and the Pear Scab (*F. pyrinum*), and gives a list of varieties of these fruits that are the most injured.

Of the insect pests, the same author notices the Codlin Moth (*Carpocapsa pomonelle*); the light brown Apple Moth, sp. et gen. undetermined; the American Blight (*Schizoneura lanigera*); Apple Root Grub (*Leptops robustus*) (?); Apple-root Maggot and Apple-root Wire Worm, both undetermined; the Apple Aphis (*A. mali*); the Apple Mussel Scale (*Mytilaspis pomorum*); the Pear Phytoptus (*P. pyri* and *Pryobia speciosa*). The list of insects affecting the Orange is far too lengthy to give here. Doubtless the Cottony Cushion Scale (*Icerya purchasi*) is the most prominent. What is commonly termed the "Green Bug," and which seems to me to be closely allied or identical with *Diphucephala splendens*, and is supposed to originate on the wattle, seriously injures both the plum and cherry in some portions of the colony by defoliating the trees. The Beetle is a *Scarabæid*, and in all probability

passes its larval stage in the ground, after the manner of our Rose Beetle, which it also otherwise resembles in habits.

The Grape Phylloxera has several times made its appearance in the vineyards of the colony, and is now, I believe, infesting vines in the vicinity of Geelong, but the heroic treatment of condemning and destroying infested vineyards, will, if promptly carried out, keep the pest in subjection.

EXPERIMENT FARMS.

There are two of these in the colony. The one at Dookie, under the management of Prof. J. L. Thompson, has been in existence for several years, and as at present managed is in every way a credit to both the manager and to the colony. The other has been but recently established, with Professor Brown, recently of Guelph, Canada, at its head.

NEW SOUTH WALES.

This is the oldest established of all the Australian colonies, although the discovery of the land which now forms a part of the colony was not made until nine days after that of Victoria, or on April 28, 1770.

The colony, as now limited, lies almost entirely between the twenty-ninth and thirty-sixth parallels of south latitude and between the one hundred and forty-first and one hundred and fifty-third meridians east of Greenwich.

The area, as estimated, comprises 310,700 square miles, or 198,848,000 acres. On January 26, 1788, the first white settlement was founded at the place where the city of Sydney now stands. This settlement was composed of five hundred and sixty-four men and one hundred and ninety-two women, convicts, with thirteen children, which were the offspring of these convicts, and one hundred and seventy-five free men and forty free women. The first ground for agricultural purposes was this year cleared at the head of Farm Cove, and an attempt was made to raise wheat, the hoe being the only implement used in cultivating. In 1793 the government purchased 1,200 bushels of wheat, this being the first sale made. In 1796 there were over 6,000 acres in cultivation, devoted to wheat and maize, and about sixty head of cattle in the colony.

In 1851, after Victoria had been detached and created an independent colony, there were 187,243 white inhabitants in the colony of New South Wales, of which 2,693 were convicts. In 1857 there were in the colony 180,000 horses; 2,148,700 cattle; 8,139,000 sheep, and 109,000 swine.

On January 1, 1860, one month after the separation of Queensland as an independent colony, thereby reducing the area of New South Wales to 309,175 square miles, there were still 336,572 inhabitants. At the end of the same year there were 260,798 acres of land under cultivation. There were also 251,497 horses; 2,408,586 horned cattle; 6,119,163 sheep, and 180,662 swine.

In 1873 there were 456,825 acres of land under cultivation, divided as follows, with the amount produced by each, of the several crops:

Product.	Amount produced.	Acreage.
Wheat ..... bushels..	2, 238, 414	166, 647
Oats ..... do....	302, 606	16, 173
Barley ..... do....	66, 225	3, 559
Maize ..... do....	4, 120, 112	116, 141
Other cereals ..... do....	25, 191	1, 607
Potatoes ..... tons..	42, 281	14, 212
Hay ..... do....	168, 945	70, 701
Vines ..... (wine) gallons..	575, 985	4, 526
Green forage (exclusive of artificial grass)	.....	36, 399
Other tillage	.....	26, 860

At the same time there were in the colony 334,462 horses; 2,794,327 cattle; 18,990,595 sheep, and 240,680 swine.

In 1888 the number of acres of land under cultivation was 1,042,394, divided and producing as follows:

Product.	Amount produced.	Acreage.
Wheat ..... bushels..	4, 695, 849	389, 390
Oats ..... do....	394, 762	19, 393
Barley ..... do....	84, 533	4, 402
Maize ..... do....	4, 953, 125	171, 662
Potatoes ..... tons..	61, 455	20, 915
Tobacco ..... cwt..	23, 465	2, 371
Hay:		
Wheat ..... tons..	70, 392	170, 106
Oats ..... do....	96, 126	
Barley ..... do....	3, 641	
Barley and lucern ..... do....	6, 438	
Sugar cane ..... do....	273, 928	15, 287
Grape vines	.....	6, 745
Grape vines for wine only ..... tons..	666, 382	3, 292
Oranges ..... dozen..	8, 704, 677	8, 875

Of live-stock the colony contained, at the beginning of 1888, as follows: 46,965,152 sheep; 1,575,487 cattle; 390,609 horses; 264,111 swine.

THE CEREAL GRAINS.

The question of the success of agricultural operations in New South Wales is altogether independent of the mere fitness of the soil for cultivation. So far experience has shown that an irregular rain-fall and a want of uniformity in the seasons, which are the chief characteristics of the climate of a large part of the interior, are a great drawback to the success of agricultural settlements. The influence of the rain-fall, however, can hardly be shown by means of figures. There are too many

onsiderations affecting the value of rain to admit of this being done. 'he period of the year at which the rain falls, the quantity falling at any ne time, and evaporation, are elements of as much importance as the ɔtal rain-fall. Hitherto the principal industry of the colony connected 'ith its soil has been its occupation for grazing, and the pastoral in. ɔrest has absorbed the energy of the colonists to so great an extent ıat agricultural pursuits have been in no slight degree neglected. uch neglect must necessarily be corrected in time, and there is every ıdication that the question will soon receive ample attention.

Wheat.—While the cultivation of this grain has been very irregular ıere has for many years been a continual gain in the area sown. In he early days of settlement, the Hawkesbury River Valley and the ountry adjacent to the towns of Parramatta, Liverpool, Penrith, Cam-en, and Maitland were the centers of considerable wheat growing. Jnskillful farming, and the consequent exhaustion of the soil, with the ttendant evils of rust, smut, and other diseases, caused these districts ɔ be abandoned little by little as wheat country, and on the discovery f the Bathurst Plains their importance at once ceased. The districts f Bathurst, Goulburn, Gundagai, Tumut, Young, Monaro, and New ɔngland were each in turn occupied by agriculturists, and the suitabil. ty of their soils and climate, as well as that of the whole mountain ɔlateau, for the growth of this cereal became definitely established. f the average production of wheat per acre in New South Wales be ɔmpared with that of the other colonies of the Australasian group, it vill be found that this colony occupies a very satisfactory place. Its ıverage is greater than that of any other portion of continental Aus-ıralia, although somewhat less than the Tasmanian yield, and consider-ıbly below that of New Zealand. The average yield per acre for the ɣears 1874 to 1888 inclusive was 14.55 bushels.

At the Exhibition there were thirty-seven samples exhibited, com-ɔrising the following varieties, viz: Purple Straw, White Lammus, White Tuscan, Talvaria, Red Velvet Chaff, Spring Wheat, Kerrier's White, White Prolific, Golden Drop, White Velvet Chaff, and California.

The Purple Straw is the most popular variety in the colony, White Lammus being almost its equal. White Tuscan does well on poor soils ınd is hardy and prolific. White Chaff has been newly introduced. Red Chaff is unpopular on account of its color. Golden Drop is prolific, ɔut very apt to rust. The Spring Wheat is quite popular, does well in ɔrdinary soils, and withstands wet weather. Many of the samples ɛxhibited were direct from the thrasher and yielded from 60 to 62½ bushels to the acre, weighing 60 pounds per bushel.

Oats.—This cereal is cultivated as a grain crop, principally in the wheat-growing districts of the colony, and as it is essentially a product of cold climates, it thrives best in those parts of the country with a winter of some severity. No oats are grown in the northern portion of the coastal districts for the purpose of a grain crop. In the southern

coast districts the area under oats for grain is very limited, but that under oats for hay or green food is not inconsiderable.

The mean average production of oats for grain for the period 1861–'66 was 19 bushels per acre, the minimum obtained in any year being 10.6 bushels (in the season of 1865–'66), and the maximum 25.1 bushels (in that of 1886–'87). Compared with the other continental colonies, New South Wales holds, in regard to average yield, the second rank, Victoria coming first; but both these colonies are surpassed by Tasmania and New Zealand. The climate of the latter colonies is much more adapted for the successful cultivation of this grain, the average produce of New Zealand, in particular, being very nearly equal per acre to that of the United Kingdom and on a par with the best oat-producing countries of the Old World. At the Exhibition nine samples were exhibited, the following being the varieties shown: Brown potato-oat, Norwegian, Tartarian Cape, Hulless.

The Norwegian is a heavy yielder, sometimes producing 80 bushels per acre. Cape is an early oat of a brown color. Hulless is not much sown.

Barley.—The cultivation of barley is very limited, the total area under crop for grain being only 4,402 acres in 1887–'88, or 9,324 acres if the area laid down for hay and green food be included, whilst the acreage is no larger than twenty years ago. About one-fourth of the whole acreage under barley is to be found in the valley of the Hunter River, the remainder being distributed over a wide extent from the district of Mudgee, along the high table land, to the southern limits of the colony. Very little barley is cultivated in the northern part of New South Wales, although it might be grown successfully in the New England district. In the western division of the coastal region the area under this crop is insignificant.

The average production per acre during the season 1887–'88 was 19.2 bushels, or a decrease of 1.5 bushels per acre below the average for previous years, which amounted to 20.69 bushels. The stationary condition of this industry is due to the small demand for the grain within the colony.

In 1887 the quantity of barley imported to make up the deficiency of home production amounted to 68,424 bushels, valued at £10,215, principally obtained from the United States, New Zealand, and Victoria. It would therefore require a very little effort on the part of the farmers to bring the production of this grain up to the level of the consumption.

An area very nearly equal to that cultivated for grain is also sown for hay, and for the purpose of providing green fodder for cattle, the figures for the season 1887–'88 being 4,402 acres of barley for grain, 3,922 acres of barley for hay and green food; the total area cultivated in 1887 being 8,324 acres, or 3,427 acres less than in 1886.

The varieties most generally sown are Cape, English, Chevalier, and Hulless. The first is four-rowed, early, and yields well. The English

and Chevalier are about equal in most respects, except that the former is used almost wholly for malting. Hulless is little sown.

Rye.—The area under rye for grain in 1887 covered only 1,091 acres, whilst 426 acres were sown for green food. The average production of the grain crop was 17.6 bushels per acre. This grain is not as much sown as formerly, and there is very little demand for the grain.

Maize.—The cultivation of maize in this colony is almost as important as that of wheat, and forms the staple industry in the valleys of coastal rivers, which are peculiarly adapted, both by soil and the climate, for the growth of this cereal. On the table land also its cultivation is attended with fair results, but as the land rises in elevation, so does the average produce per acre proportionately decrease. Attempts have been made to grow maize in the western division of the colony, but success has only been met with under special conditions of natural or artificial irrigation, for the plant demands a considerable amount of moisture, and thrives better in the moist climates of the coast than anywhere else in the country. Although the area under maize is less than half of that under wheat cultivation, the gross yield obtained is frequently as large, and in some seasons greatly exceeds that of wheat.

The area under maize cultivation was increased from 57,959 acres in the year 1862 to 171,662 in 1888, and was therefore trebled in twenty-seven years. Considered in the light of the general advance of settlement, particularly in those districts where this cereal may be successfully cultivated, there is nothing so remarkable in the progress thus exhibited, especially as there is no lack of land in New South Wales fit for maize cultivation. The fact is, nevertheless, worthy of notice, that in the year 1888 an area of 24,705 acres was added to the total acreage under maize for grain in 1887, a much greater increase from one year to another than ever took place during the past twenty-seven years, with the exception of the year 1879, when 25,072 acres were added to the area under maize in 1878.

There were displayed at the Exhibition seventy-three samples, the popular varieties being Yellow White Cove, Golden Drop, and Large Hard Flint. The Yellow ninety-day and Yellow one hundred and twenty day are good. The Red Hogan, Hogan's Spindle, Small Red-pitt, Small Hard Flint, French, and American Enible are also grown. A very good white corn is also raised. A variegated black and white variety is not popular.

HAY AND FODDER.

Wheat is grown in considerable areas for hay and fodder for cattle, and the area under cultivation is steadily increasing, although the produce is still short of the requirements of the country. The whole of the wheat grown for hay in the colony is consumed locally. The following

statement shows the extent of land under wheat for hay, with the yearly produce, during eleven years:

Area under wheat for hay, and yield.

Year ended March 31—	Acres.	Produce in tons.	Year ended March 31—	Acres.	Produce in tons.
1877	17,115	21,297	1883	42,592	43,997
1878	29,640	29,137	1884	49,348	56,348
1879	22,888	31,320	1885	86,594	87,326
1880	25,281	32,943	1886	105,122	74,606
1881	41,137	44,037	1887	74,070	101,851
1882	39,428	42,378	1888	60,340	70,392

From the foregoing figures it will be seen that the cultivation of wheat for hay is increasing at a much greater ratio than that for grain, the area so cultivated having reached in 1887-'88 nearly four times that cultivated for the same purpose in 1877, whilst the production was over three times as great. Long series of dry years may in some measure account for the increased area devoted to hay; but the steady demand for hay and chaff, wheaten as well as oaten, and the large import of this product fully justify an extension of its cultivation. The decrease observable since 1886, when an area of 105,122 acres under wheat was cut down for hay, is entirely due to climatic conditions during that and the following seasons.

In parts of the colony where the climate is not suitable for maturing the grain, a large area of oats is sown for hay and green food. The area under oats for these purposes has increased from 28,109 acres in 1861 to 128,962 acres in 1886, being over four and a half times as large in the latter as in the former year; but it fell to 36,451 acres in 1887. Oaten hay is much in demand, and sells readily at remunerative prices, and as there is less expense and lighter labor attached to this form of cultivation, the system of growing oats for hay is consequently more in favor with the farmers of New South Wales than the cultivation of the grain. The area under the two crops stood to each other in the following relation in the year 1887:

	Acres.
Area under oats for grain	19,393
Area under oats for hay and green food	86,451
Total area under oats	105,844

The area harvested for grain being only 18.3 per cent. of the total area under oats.

Maize is not only cultivated as a grain crop, but a small area is sown for green food for cattle, chiefly on dairy farms. In 1887 the area thus cultivated was 2,724 acres, a greater part in the Camdem and south coast districts.

Besides these, horse or Scotch beans, the gray and the drum peas, sorghum, pearl-white and French millet and Hungarian, etc., are grown extensively for fodder.

Lucern.—Lucern and other permanent grasses are grown principally in the Hunter districts, and the south coast, 53,468 acres being so cultivated in the Shoalhaven district alone. The practice of sowing permanent grasses is also extending to the north coast districts, and in 1887 there were 21,984 acres under grass in the Richmond district. It is, however, in those portions of the colony where dairy farming is principally carried on that the use of permanent grasses is most general.

Rye grass, Cockfort and Prairie grass are all popular for dairy pastures. These are not grown for hay. Wheat and oats, half and half or separately, are much grown. Grass seed comes from New Zealand almost exclusively.

FRUITS.

My information regarding the fruit-growing industry in this colony is rather limited. There are, I believe, one or two canning establishments in the colony which appear to do a paying business, the product finding a ready sale in the colonies. Regarding the value of the industry, and, in fact, of fruit-growing as an industry, I have not been able to secure statistical information.

The following is a list of the popular varieties of fruit grown. In the cases of apples and grapes I give only the American varieties and, in the former case, the native varieties least liable to blight.

APPLES (AMERICAN).

Aromatic Carolina.	Clayton.	Meyer's Nonpareil.
Baldwin.	Defiance.	Nickajack.
Bedford, new.	Disharoon.	Red Warrior.
Betty Geeson.	Dougherty.	Rome Beauty.
Buncomb on Red Winter Pearmain.	Great Unknown.	Shockley.
	Grimes Golden Pippin.	Sonoma.
Cannon Pearmain.	Jewett's Best.	Stevenson's Winter.
Carolina Red June.	Julian.	Toccoa.
Carter's Blue.	Kentucky Red Streak.	Webb's Winter.
Chestona.	Kittageskee.	Yates.

APPLES (LEAST LIABLE TO BLIGHT).

This list includes some first-class varieties but little affected with blight, and likely to prove of great service to small or private growers.

Baxter's.	Jupp's Surprise.	Scott's Red Streak.
Billey's Seedling.	Maiden's Blush.	Shepard's Perfection.
Christmas Kitchen.	New England Pigeon.	Ward's Seedling.
Devonshire Quarrenden.	Northern Spy.	Willis Late.
Five Crown Pippin.	Red Caldwell.	Winter Majeting.
Irish Peach.		

PEARS.

Alexandre Bivort.
Ambrosia.
Asten Town.
Bergamot Autumn.
Bergamot d'Esperen.
Bergamot Gansels.
Bergamot White.
Beurre d'Amaulis.
Beurre d'Aremberg.
Beurre Bosc.
Beurre Brown.
Beurre Clairgeau.
Beurre Diel.
Beurre Easter.
Beurre Rance.
Beurre Van Mons.
Black Achan.
Bon Chrétien Turc.
Bon Chrétien Williams.
Broompark.
Chaumontel.
China.
Citron des Carmes.
Christmas.
Colmer d'Aremberg.
Colmar Passe.
Comte de Lamy.
Comte de Paris.
Crasanne.
Crasanne Althorpe.
Crasanne Winter.
Doyenne Goubalt.
Duchesse d'Angoulême.
Flemish Beauty.
Fondante d'Automme.
Glou Morceau.
Jargonelle.
Kissing Point.
Large Flat Baking.
Louise Bonne of Jersey.
Marie Louise.
Napoleon.
Peach.
Swan's Egg.
Windsor, or Cape.
Winter Nelis.

APRICOTS.

Angoumois Hâtive.
Beauge.
Black American.
Breda.
Bush Peach.
Canino Grosso.
Elruge.
Grosse Pêche.
Hâtive d'Avergne.
Hemskirke.
Kaisha.
Large Red.
Late George Royal.
Late Warwick.
Montgamet.
Moorpark Temples.
Orange.
Oullin's Early Peach.
Pale Superb.
Peach.
Pennant Hills.
Red Masculine.
Royal.
Shipley's.
Turkey.

CHERIMOYER (OR CUSTARD APPLE).

Rough Fruited.

CHERRIES.

Archduke.
Aston.
Belle Agathe.
Belle d'Orleans.
Bigarreau.
Bigarreau Napoleon.
Bigarreau de Holland.
Black Eagle.
Black Heart.
Black Tartarian.
Bowyer's Early Heart.
Claremont.
Elton.
Empress Eugenie.
Downton.
Florence.
Kirtland's Mammoth.
Knight's Early Black.
Late Duke.
May Duke.
Morello.
Planchory.
Reine Hortense,
Royal Duke.
Scarlet Bigarreau.
St. Margaret's.
Waterloo.
Werder's Early Black.
White Heart.

FIGS.

Angelique.
Black Genoa.
Black Ischia.
Black Italian.
Blue Provence.
Brown Ischia.
Brown Turkey.
Brunswick.
Bull's No. 1.
Castle Kennedy.
Early Violet.
Early Prolific.
Fique d'Or.
Green Ischia.
Large Black Genoa.
Large Blue.
Marseilles White.
Singleton Perpetual.
Smyrna.
Small Blue.
White Bourgassotte.
White Genoa.
White Ischia.
White Provence.
Yellow Ischia.

GUAVAS.

	Yellow.	Parker's Hybrid, new.

MEDLARS.

	Nottingham.	Royal.

MULBERRIES.

lish.	Downing's Everbearing.	Prolific.
	Hick's Everbearing.	White Chinese.

NECTARINES.

.	Humboldt.	Seedling Stanwick.
	Lord Napier.	Stanwick.
ate.	Newington Early.	Stanwick Elruge.
	Oldenburgh.	Sydney Market.
	Pitmaston Orange.	Victoria.
	Red Roman.	Weeping.
ping.	River's Orange.	Willis' White.
y.	Scarlet.	

ORANGES.

	Mandarin, Emperor of China.	Seville.
	Mandarin, Thorney.	Siletta.
el.	Mandarin, Scarlet.	St. Iago.
ltese.	Parramatta.	St. Michael's.
	Queen.	Tangierine.
	Rio.	Teneriffe.
nton.	Sabina.	Willis' Siletta.

LEMONS.

	Helong.	Lisbon, Thornless.

LIMES.

	Persian, or Sweet.	West Indian.

SHADDOCKS.

	Blood.	Manilla.

CITRONS.

	Dwarf.	Mazzi, Spurways.
	Knight.	Spurways.

PEACHES.

	Early Alfred.	Malta.
	Early Silver.	Noblesse.
ate.	Early York.	Noblesse (Shepherd's).
ate.	Emert's Large.	Red Magdalen.
o.	Flat China.	Red Nectarine.
	Frazer's Newington.	Reine de Verges.
	George the Fourth.	Royal George.
Yellow.	Goliath.	Salway.
nde.	Grosse Mignonne.	Shanghai.
blesse.	Grosse Mignonne (early).	Stump the World.
ster.	Italian Red.	Walburton Admirable.
ague.	Italian Yellow.	Weeping.
	Lady Palmerston.	Willis' Red June.
gton.	Lord Palmerston.	Yellow Mundi.

PLUMS.

American Damson.
Angelina Burnett.
Belgian Purple.
Gryanstone Gage.
Coe's Golden Drop.
Coe's Late Red.
Damson.
Damson Prune.
De Montford.
Dennison's Superb.
Diamond.
Early Favorite.
Early Orleans.
Early Prolific.
Early South American Red.
Early South American Yellow (Prunus Americana, or Cherry Plums).
Fellemberg.
Gage, Blue.
Gage, Green.
Gage, Purple.
Guthrie's Aunt Ann.
Huling's Superb.
Ickworth's Imperatrice.
Impériale de Milan.
Kirk's Golden Yellow.
Late Black Orleans.
Loutherborough.
Magnum Bonum Red.
Magnum Bonum White.
Mitchelson's.
Newman's.
Orleans.
Orleans, Late.
Orleans, Lawrence's.
Prince Englebert.
Prince of Wales.
Quetsche St. Martin.
Reine Claude de Bavey.
Royal de Tours.
Royal Native.
Standard of England.
Victoria.
Washington.
Wild Goose.

BANANAS.

Cavendishii.
Charlotte.
Sapientium.
Sugar Banana.

BLACKBERRIES.

Himalayan.
English.
Laughton.

CURRANTS.

Red La Fertile.
Red La Versailles.
Black Grape.
Red Dutch.
White Dutch.
White Transparent.
Black Naples.

GOOSEBERRIES.

Crown Bob.
Greenwood.
General Graham.
Lion's Provider.
Lord Crewe.
Leveller.
Ploughboy.
Rifleman.
Roaring Lion.
Slaughterman.
Warrington.
White Eagle.
White Lion.
Sulphur.

GRAPES.

Angus Frontignan.
Black Damascus.
Black Hamburg.
Black Monukka.
Black Prince.
Black Spanish.
Chasselas Vibert.
Duchess of Bucclench.
Golden Champion.
Golden Hamburg.
Hermitage, or Shiraz.
Joslyng's St Alban.
Lady Downe's Seedling.
Madresfield Court.
Mrs. Prince's Black Muscat.
Mill-Hill Hamburg.
Muscat of Alexandria.
Black Tripoli.
Bowwood Muscat.
Buckland's Sweetwater.
Calabrian Raisin.
Chaptal.
Chasselas.
Muscatel, Black.
Muscatel, Red.
Muscatel, White.
Royal Ascot.
Shepherd's Reisling.
Snow's Muscat.
Sweetwater.
Trentham, Black.
Verdeilho, or Madeira.
Wantage.
White Sherry.
Ullade.
Zante Currant.

GRAPES (AMERICAN).

	Isabella.	Salem.
	Le Noir.	Wilder.
a.	Miles.	Diana.
re.	Rebecca.	Maxatawny.
ro.		

PASSION FRUIT.

	Edulis.	Macrocarpa.
eana.		

QUINCES.

haped.	Orange.	Master's Early.
aped.	Chinese.	Rea's Mammoth.
'ortugal.		

STRAWBERRIES.

Queen.	Keen's Seedling.	Trollope's Chilian.
s Eugenie.	Marguerite.	White Chilian.
	Myatt's Pine.	Warren's Red Chilian.
	Sugarloaf.	

RASPBERRIES.

p Red.	Falstaff.	Victoria.
p White.	Northumberland Fillbasket.	

SOUTH AUSTRALIA.

the boast of this colony that it was not the offshoot of any of the olonies, nor that its childhood was nurtured by any of its older , but that from the first it was a distinct, independent individual. ver, it was the exponent of a new theory of colonization, evolved ward Gibbon Wakefield.

he northern shores of this colony were among the first of Aus- o be discovered, so also were the southern among the last. The ations of Captain Stuart in the year 1831 were followed by the shment of a colonial government in 1836, the 28th day of Decem- which year South Australia considers its birthday. The colony tween the eleventh and thirty-eighth degrees of south latitude, tween the one hundred and twenty-ninth and one hundred and rst meridians of east longitude, and comprises an area of about ,600 acres.

population in 1836 was 546. In 1887 it was estimated at 317,446. statistics relating to agriculture or agricultural products have llected since 1884, I am unable to give later data. At the time ned, the condition of the colony, agriculturally speaking, may be ed as below.

Land under cultivation, 2,785,490 acres, devoted to the several crops, and producing as follows:

Product.	Amount produced.	Acreage.
Wheat.....bushels..	14,621,755	1,942,453
Oats.....do....	88,639	7,254
Barley.....do....	211,207	15,697
Other cereals.....do....	64,826	4,601
Potatoes.....tons..	23,192	5,666
Hay.....do....	285,829	308,429
Vines.....(wine) gallons..	473,555	4,590

The number of live-stock in the colony in the year 1884 was as follows:

Horses	168,420	Sheep	6,696,406
Cattle	389,726	Swine	163,807

In 1888 these numbers had increased as follows:

Horses	170,000	Sheep	7,254,000
Cattle	440,000	Swine	179,000

In 1886 the value of live-stock exported was £144,735; skins, hides, and tallow £126,831. The quantity of wool exported during the same year was 44,792,613 pounds. The quantity of wool produced in 1887 was 40,622,400 pounds, valued at £1,184,820.

The long-protracted droughts which so frequently occur in the southern portion of this colony are a great obstacle to both the grain and stock growing industries. The mean approximate rain-fall in inches in the agricultural districts for each month of the years 1861–'87, inclusive, is as follows: January, 0.824; February, 0.675; March, 1.026; April, 1.059; May, 2.967; June, 2.891; July, 2.883; August, 2.587; September, 2.169; October, 1.832; November, 1.075; December, 0.909.

The average annual rain-fall in the southern sections for this period of twenty-six years was only 21.387 inches. (In the northern territory the rain-fall is about 66 inches per annum.) Such aridity does not occur in the United States except in the country between the ninety-seventh meridian and the Pacific coast. Throughout nearly all of the grain-growing portions of the United States the average annual precipitation is from 30 to 60 inches.

THE CEREAL GRAINS.

While the soil of South Australia seems far from deficient in productive qualities, and the acreage of grain per each inhabitant is greater than in any other of the colonies, the mean average yield per acre is below that of any of the others. From what I was able to observe in the vicinity of Adelaide it would appear that the country was better adapted for fruit than grain; yet, on the sewage farms in the vicinity

'that city, and elsewhere where the land is irrigated, the amount of ;getation produced was simply astonishing.

Wheat.—This is the principal cereal sown in the colony and has been ıe of the principal articles of export since 1850, prior to which time ıe entire product was consumed at home.

The production for 1888, according to the Melbourne Age of January ;, 1889, was as follows:

Acres sown		1,937,000
Acres reaped for grain		1,737,000
Yield	bushels..	6,813,000
Value of crop		£1,500,000
Average yield per acre	bushels..	4

The rain-fall throughout the grain-growing district was 9 inches below e average, or about 12.387 inches.

According to close estimate the figures for 1887 were:

Acres of wheat sown		1,950,000
Amount produced	bushels..	19,012,500
Average yield per acre	do...	9¾

Rain-fall, 2 inches above the average, or 23.39 inches.

The average yield of this grain per acre for thirteen years, 1873 to 85, inclusive, was 7.10. In connection with these figures I cannot ılp paying Professor Lowrie, principal of the Agricultural College of e colony, the compliment of giving the yield of one of his fields in 88, containing 80 acres, which produced an average of 14.20 bushels ;r acre without irrigation.

The following varieties were exhibited at the Melbourne Exhibition, ıd may be said to be the most popular sown: Scotch Wonder, African earded, White Tuscan, White Essex, Ward's Prolific (said to be rust oof), Lion Defiance, Agerian, Du Toit's, Purple Tuscan, Steinwedel's, wenty Weeks, Excelsior, Sheriff's Prolific.

In this colony plowing for wheat and sowing the same begins in April ıd May, or even in June, according to locality, and is usually finished ; July. The grain begins to head late in October or early in Novem- ;r, and harvesting is general throughout the colony by Christmas, the ripper being generally used for harvesting the grain.

Oats.—This grain is grown only in limited quantities, where the cli- ate is cooler and moister than the average. The area sown is princi- ally used for hay, and, indeed, the grain is seldom offered for sale in ıe market. The average yield of grain per acre for the years 1873 to 85, inclusive, was 12.79 bushels. The popular varieties are White, ape, Tartarian, Triumph.

Barley.—This is not sown in sufficient area to supply the local de- and, although a very fair quality of the grain is produced. Cheva- r and English are the favorite varieties, and the average yield for a ries of years has been 12.59 bushels per acre.

Rye.—This grain is sown to such a small extent that it is hardly

worth mentioning, except to record the fact of its neglect. It appears to have been voted an unprofitable crop in nearly all of the colonies.

Maize.—This cereal is almost wholly neglected, in fact I think entirely so, except for green fodder. That it would succeed well if irrigated is beyond a doubt but for the present it is, perhaps, not profitable to grow it.

Hay.—In South Australia hay is made of the wheat plant, mowed just as the wheat is forming in the ear, and dried for a few days in the sun. In a series of papers published by M. J. G. O. Tepper, of Adelaide, the following grasses are recommended as fodder plants: *Lepturus incurvatus, Anthistiria ciliata, Phalaris minor, Stipa aristiglumis, Pentapogon billardieria, Pappophorum commune.*

Lucern is becoming very popular of late, both as an ensilage and fodder plant, and is used to some extent for pastures. The growth of this plant in this colony on irrigated lands is simply astonishing, from five to twelve crops being cut from the same ground during a single year.

FRUITS.

While all sub-tropical fruits produce enormously, and the country seems in every way adapted to their growth, I was not able to secure statistical data as to the value of the fruit-growing industry. I spent a day among the fruit farms and vineyards about Adelaide, and what I saw was a wonder—apples, peaches, pears, figs, oranges, and other fruits, growing in such luxuriance, while the vines of various other varieties of grapes were literally loaded down with fruit, some of the clusters weighing ten to twelve pounds.

It has been proven that green fruit can be successfully exported both to the United States and England, but there appears to be little done in that direction. There must certainly be a bright future for the South Australian fruit grower.

The following is the result of the practice of five of the principal growers in South Australia and Victoria, furnished me by Mr. A. Molinaux, editor of "The Garden and Field," and Secretary of Agriculture for the colony.

BEST FRUIT TREES FOR GENERAL PURPOSES.

APPLES.

A great prejudice exists against planting apple trees on the plains. Why, it is hard to say. The trees grow well, are almost free of American blight, and up to the present time have not been attacked by *Fusicladium;* and if this pest continues its ravages as it has done in the hills, those plains gardeners who have a fair proportion of apple trees will bless the time they planted them. Of early varieties I recommend ripening in order named:

Red Astrachan.	Devonshire Quarrenden.	White Australian.
Lord Nelson.	Gravenstein.	Emperor Alexander.

Medium (apples).

toyal.	Cornish Aromatic.	Claygate Pearmain.
Pippin.	Prince Bismarck.	Esopus Spitzenberg.
de Canada.	Dumelow's Seedling.	Jonathan.

Late (apples).

	Scarlet Pearmain.	Dunn's Seedling.
Pippin.	Baldwin.	Kentucky Red Streak.
lonpareil.	Garibaldi.	Stone Pippin.
rry Pippin.	Cleopatra.	

PEARS.

le.	Marie Louise.	Josephine de Malines.
' Bon Chrétien.	Beurre Clairgeau.	L'Inconnue.
Bergamot.	Vicar of Winkfield.	Uvedale's St. Germain.
Beauty.	Winter Nelis.	

PLUMS.

'rolific.	Kirke's.	Reine Victoria.
olet.	Goliath.	Yellow Magnum Bonum.
Burdett.	Reine Claude Rouge.	General Hand.
age.	Prince of Wales.	Coe's Late Red.
l.		

APRICOTS.

range.	Moorpark.	Mansfield Seedling.
Early Peach.	Viard.	
k.	Leawood Perfection.	

PEACHES.

atrice.	Royal George.	Malta.
rk.	Evandale Favorite.	Comet.
wington.	Noblesse.	Salway.
Edinburgh.	Meri-Meri.	Lady Palmerston.

NECTARINES.

	Albert Victor.	Stanwick.
awny.	Prince of Wales.	

CHERRIES.

rleans.	Elton.	Black Tartarian.
wyford Bigarreau.	May Duke.	Florence.
rons.	Bigarreau.	St. Margaret.
s Early Black.	Bigarreau Napoleon.	

ALMONDS.

Brandjs and Nonpareil.

THE AGRICULTURAL COLLEGE.

This institution was only organized in 1882, and hence is yet in its infancy. The building is a fine, commodious, two-story stone structure, with accommodations for a large number of students. The farm consists of 828 acres, devoted to general farming and experimental work. The experiments comprise investigations with respect to the value of various fertilizers, varieties of grains, grasses, vegetables, and fruits. Thick and thin, shallow and deep seeding, feeding of stock, and in fact much the same lines of investigations are being followed as in American experiment stations.

Professor Lowrie, the present principal, is young and energetic and has taken hold of the work with a spirit which merits success.

THE ADELAIDE SEWAGE FARM.

It seems to have remained for Adelaide to practically and effectually settle the problem of the disposal of sewage, a matter which so sorely vexes American corporations.

The sewage farm consists of 480 acres of land lying between the city and the sea. There are a little over 102 miles of sewer in the city, through which all the sewage is conducted to the farm.

The farm is worked on the broad irrigation principle, combined in the winter months with intermittent downward filtration. The filter-beds are thoroughly underdrained and work most effectually, the effluent carried off therefrom being perfectly clear and pure.

The sewage, after being strained, is conducted over the farm by means of cement concrete carriers and wooden troughing. The carrier drains are pierced at regular distances by openings (which can be closed at pleasure), whence the sewage flows into the filter-beds. These beds merely consist of ridge and furrow with tile drainage under each filter-drain; at a depth of 6 or 7 feet under the furrow porous drain pipes are laid and covered with coke, or similar substance to keep back the silt, etc.; these pipe drains are connected with an intercepting drain of sufficient diameter to conduct the effluent water into the outer channel.

At present the live-stock upon the farm consists of about three hundred cows and bullocks, thirty horses, three hundred sheep, and one hundred and sixty pigs.

The rate charged for depasturing large cattle ranges from 3*s.* 6*d.* to 5*s.* per week. Cattle, bought as stores, after having been on the farm for three months double their market value. The pigs are well worthy of notice, being as fine a lot as could be seen anywhere. They are fed on mangold leaves, pulped mangolds, lucern, and a little meal, and also the skim milk purchased from a neighboring dairy farm at a nominal price.

About 150 acres have been laid down in lucern. The paddocks are

l every three weeks to a depth of 3 inches. The soil varies from loam to a stiff clay. The yield obtained at each cutting is from tons per acre, cut eight times a year. The lucern brakes let at £10 per acre, but it is found more expedient for the manager n all the land in his own hands, in order that the watering may ɛr controlled and distributed over a larger area.

› is little doubt that under good management, such as the farm ioys, this property must become most valuable, and the income ll be ultimately derived therefrom go a long way towards pay- ırest upon cost of the works carried out both in the farm and in ns benefited by the deep-drainage system. The last year's (1886) -sheet indicated a profit of £950. The number of men employed 'arm is about fourteen.

THE NORTHERN TERRITORY.

portion of the colony of South Australia seems to be awaiting ent development, the agriculture being almost wholly experi- as yet. The following exhibit of agricultural products was dis- at the Exhibition:

FODDER PLANTS.

(*Reawa luxurianus*).
(*Andropogon sorghum*).
ɔrn (*Sorghum vulgare*).
rass (*Andropogon halepense*).
Gama grass (*Tripsacum unioloides*).
Millet (*Panicum italicum*).
California millet (*Pencillaria spicate*).
Coix grass (*Coix agrartis*).

TOBACCO IN LEAF (GROWN FROM IMPORTED SEED).

i, broad-leaved.
y.
ɔo.
Latakia.
Chinese, red-flowered.
Manila.
Violet-scented.
Hungarian Debroer.
Hungarian Werpeleter.
Missouri.
Connecticut.
Jamaica.
Domingo.
Virginia, ruffled leaf.
Florida.

CEREALS AND PULSE.

yanus indicus).
ed.
llet seed.
seed.
olden Drop.
Horse-tooth.
aragua.
rown King Philip.
Maize, Papagay.
Maize, Plount's Prolific.
Rice, Chinese Hill.
Rice, Padie iung poetih.
Rice, Padie iung meerah.
Rice, Padie loiloit iung po- etih.
Rice, Koema.
Rice, Black Preanger.
Rice, Saigon.
Bearded millet, in ear.
Pearl millet, in ear.
Earth bean (*Voandzeia subterranea*).
Horse gram,

NEW ZEALAND.

T' e insular colony of New Zealand consists of two principal islands, called the North and South Islands, and a small island at the southern extremity, called Stewart's Island. The entire group is located between the thirty-fourth and forty-eighth degrees south latitude and one hundred and sixty-sixth and one hundred and seventy-ninth meridians of east longitude. The area of the entire colony amounts to about 64,640,000 acres, the North Island comprising 28,000,000, the South Island 36,000,000, and Stewart's Island 640,000 acres.

In the entire colony there are about 12,000,000 acres of land naturally adapted for cultivation, the remaining portion of 50,000,000 acres being better adapted for grazing; but about two-fifths of this last acreage is at present covered with forests. As wool growing is, however, the most important of the industries, it will be observed that this proportion of grazing land is quite satisfactory.

Unfortunately I am not able to follow the agricultural progress of the colony from the first landing of Captain Cook, in 1769, to the foundation of the colony in 1839, and can give only very meager information as to its condition, agriculturally speaking, from the latter date down to 1873. This is largely due to the fact that documents not obtainable at the New Zealand Court of the Melbourne Exhibition have not reached me in time to use in the preparation of this report. This statement will explain the lack of late statistical information also. To this must be added the fact that no time was at my disposal to enable me to visit the colony in person.

In 1853 the white population was about 28,000; in 1872 the white population numbered 279,560.

The value of wheat and oats exported in the year 1853 was £13,474. The value of the same in 1872 was £175,234. The export of tallow, hides, and sheep-skins for 1853 amounted in value to £618; in 1872, to £120,660.

In 1873 there were 376,156 acres of land under cultivation, of which there were in—

Product.	Amount produced.	Acreage.
Wheat.....bushels..	3, 391, 644	132, 428
Oats.....do....	3, 292, 807	110, 472
Barley.....do....	606, 492	22, 124
Maize.....do....	18, 795	1, 253
Other cereals (exclusive of peas and beans).....do....	75, 000	5, 000
Potatoes.....tons....	51, 758	11, 617
Hay.....do....	62, 187	43, 516
Green forage (exclusive of artificial grass).....	.....	25, 515
Permanent artificial grasses.....	.....	5, 400, 000
Other tillage.....	.....	24, 132

The number of live-stock for 1873 is not known, but in 1874 numbered as follows: Horses, 99,859; cattle, 494,917; sheep, 11,704,853; swine, 132,921.

The value of grain exported in 1887 was £445,092; butter and cheese, £109,483; frozen meats, £455,895; tallow, £147,233; wool, £3,322,068. The frozen-meat industry only began in 1882, with an export value of £19,000.

The total number of acres of land under all kinds of crops in 1888, and land broken but not under crop, amounted to 4,231,700. Land sown to grass, but not previously plowed, 3,053,052 acres. The acreage of each of the agricultural products for 1888, except wheat and oats, is not obtainable, but in 1886 the acreage of all was as follows:

Products.	Amount produced.	Acreage.
Wheat.....bushels..	5,279,638	253,025
Oats.....do....	11,937,295	387,228
Barley.....do....	558,606	21,535
Maize.....	.....	4,720
Other cereals.....	.....	10,217
Potatoes.....tons..	134,965	27,683
Hay.....do....	79,013	57,938
Green forage.....	.....	416,682
Other tillage, including lands in fallow.....	.....	193,191

There were in the colony in the same year 187,382 horses, 895,461 cattle, 15,254,198 sheep, 369,992 swine.

THE CEREAL GRAINS.

Of the cereal grains, wheat, oats, and barley may be grown profitably, Indian corn being grown only to a limited extent in the North Island.

Wheat.—The acreage of crops of 1887–'88, a bad season, amounted to 350,000 acres, and the entire product amounted to 9,500,000 bushels, or an average of 27¼ bushels per acre. Under very favorable conditions immense yields have been obtained, 82 bushels per acre and over having been secured, weighing 70 pounds per measured bushel, and besides this I have authentic information of yields of 100 bushels per acre. The most popular varieties are as follows, with the yields per acre which have been obtained from each, in fields of from 30 to 75 acres:

	Bushels.		Bushels.
Red Tuscan	82	White Tuscan	43
Red Chaff	52	Molds Enoble	40
Purple Straw	50	White Velvet	40

The name of the variety yielding 100 bushels (in fields, not experiment plats) I was not able to learn.

The mean average yield of wheat per acre throughout the entire col-

ony for the years 1874 to 1888 inclusive, was 26.16 bushels, being considerably more than double the average yield of the United States.

Thirty-one varieties of wheat were exhibited, both in sheaf and thrashed grain, the Red Tuscan and Purple Straw appearing to be the most vigorous growers.

Insect enemies of wheat.—Serious damage to a field of 300 acres of wheat was reported in 1887 as having been caused by the Hessian fly, but Mr. Frazier S. Crawford (Department of Agriculture Bulletin, January, 1888, Melbourne, published by the Government) states that much of the damage attributed to the Hessian fly was due to other insects. I could learn of no damage done by the pest in 1888, but suppose there must have been at least some injury, though unnoticed. The Government of New Zealand has recommended that farmers burn infested stubble and plow the ground, but do not consider further action necessary.

Oats.—This crop is sown both for the grain and also for green fodder. The acreage sown for the season of 1887–'88 was 340,000 acres, which produced in thrashed grain 10,000,000 bushels; the yield per acre varies from 30 to 120 bushels, the general average per acre for the year being 31.24 bushels.

The most popular varieties of oats with the weight per measured bushel are given here, these being all white varieties:

	Bushels.
Danish	49½
Long Tartarian	49½
Canadian	45 to 56½

The mean average yield of this grain, per acre, for the years 1874 to 1888, inclusive, was 32.26 bushels. The average yield in the United States is 26 bushels.

The Black Feed oat is grown almost exclusively for fodder. In all, ten varieties of this grain were exhibited, not including the Potato oat, which is said to be of a very fine quality.

Barley.—This is grown to a somewhat limited extent, the area in 1887–'88 being 28,000 acres and the grain harvested amounted to 77,000 bushels. The grain does well, however, the average yield for this season being 27.26 bushels per acre.

Maize.—In the North Island this can be grown for grain, but in the South Island it is only grown as a fodder plant. As in Victoria, I do not think the value of the grain is fully appreciated, and its cultivation will probably increase as the New Zealand farmer becomes more familiar with its uses. At present it is mostly grown by the native Maoris, who do not appear to be familiar with the different variety of seed.

Forage plants.—Prof. Thomas Mackay, in his Manual of the Grasses and Forage Plants useful to New Zealand, Part I, gives the following list of plants which have been, or ought to be, introduced into the colony:

I.—NATURAL GRASSES.

may be divided into two classes, coarse and fine.

Class 1.—*Coarse grasses.*

ot, *Dactylis glomerata.*
fescue, *Festuca pratensis.*
ue, *Festuca elatior.*
fox-tail, *Alopecurus pratensis.*
Timothy or cat's-tail, *Phleum pratense.*
Prairie-grass, *Bromus uniolides.*
Perennial rye-grass, *Lolium perenne.*
Italian rye-grass, *Lolium italicum.*

Class 2.—*Fine grasses.*

dog's-tail, *Cynosurus cristatus.*
scue, *Festuca duriuscula.*
fescue, *Festuca ovina.*
talked meadow-grass, *Poa trivi-*
Golden oat-grass, *Avena flavescens.*
Fiorin, *Agrostis stolonifera.*

II.—ARTIFICIAL GRASSES.

lover, *Trifolium repens.*
lover, *Trifolium hybridum.*
al red clover or cow-grass, *Tri-*
pratense-perenne.
broad clover, *Trifolium pratense.*
Lucern or alfalfa, *Medicago sativa.*
Sainfoin, *Onobrychis sativa.*
Vetch or tares, *Vicia.*
Yarrow, *Achillea millefolium.*

III.—FORAGE PLANTS OF SPECIAL VALUE.

orn or maize, *Zea mays.*
n millet, *Panicum miliaceum.*
sugar-cane or sorgho, *Sorghum*
m or *Sorghum saccharatum.*
er, *Helianthus annuus.*
rassica napus.
d-headed kale.
e, *Brassica oleracea.*
Turnip, *Brassica rapa.*
Mustard, *Sinapis.*
Mangold-wurzel.
Carrot, *Daucus carota.*
Parsnip, *Pastinaca sativa.*
Field pea, *Pisum arvense.*
Bean *Faba.*

art VI of "The Indigenous Grasses of New Zealand," published Colonial Museum under direction of Sir James Hector, the fol- indigenous grasses are recommended for the several uses:

ollowing alpine species are worthy of experimental cultivation as pasture on low land:

ta Colensoi.	Catabrosa antarctica.	Poa foliosa, var. b.
s Muelleri.	Danthonia australis.	Poa Mackayi.
s setifolia.	Danthonia ovata.	

ollowing species are recommended for cultivation as pasture grasses.

ena stipoides.	Danthonia semi-annularis	Poa Colensoi.
loe alpina.	(varieties).	Poa uniflora.
australis.	Danthonia pilosa.	Poa breviglumis.
chne crinita.	Danthonia pilosa (varie-	Poa Kirkii.
chne sciurea.	ties).	Poa Lindsayi.
lus elongatus.	Danthonia nuda.	Festuca duriuscula.
s canina.	Danthonia Thomsonii.	Festuca scoparia.
s parviflora.	Trisetum antarcticum.	Triticum scabrum(varieties).
s avenoides.	Trisetum subspicatum.	Triticum multiflorum.
s Youngii.	Poa anceps (varieties).	Deyeuxia scabra.
nia semi-annularis.	Poa intermedia.	

The following species are recommended for cultivation as fodder grasses:

Dichelachne crinita.	Danthonia flavescens.	Poa uniflora.
Dichelachne sciurea.	Danthonia semi-annularis.	Festuca duriuscula.
Agrostis avenoides.	Danthonia Buchanani.	Triticum scabrum.
Agrostis Youngii.	Trisetum antarcticum.	Arundo conspicua.
Danthonia Cunninghamii.	Poa anceps, var. elata.	Arundo fulvida.
Danthonia Raoulii.	Poa intermedia.	

FRUITS.

Fruit growing appears to be one of the neglected industries also, notwithstanding that many of them grow luxuriantly. The following list taken from a most valuable work, "New Zealand, her Commerce and Resources," by Hon. G. W. Griffin, formerly United States consul to the colony, will give an idea of the fruits grown, especially in the vicinity of Auckland:

APPLES.

Joanneting.	Hawthornden.	Ribston Pippin.
Irish Peach.	Court of Wick.	Newton Pippin.
Devonshire Quarrenden.	Claygate's Pearmain.	Stone Pippin.
William's Favorite.	Beauty of Kent.	Northern Spy.
Duchess of Oldenburg.	Blenheim Pippin.	Boston Russet.
King of the Pippins.	Dumelow's Seedling.	Scarlet Nonpareil.
Lord Suffield.	Brabant's Bellefleur.	Shepherd's Perfection.
Gravenstein.	Prince Bismarck.	Winter Pearmain.
Cellini.	Alfristan.	Winter Majentin.
Emperor Alexander.	Reinette de Canada.	Norfolk Biffin.
American Golden Russet.	Adam's Pearmain.	Sturmer Pippin.
Cox's Orange Pippin.		

NECTARINES.

Hunt's Tawny.	Roman.	Albert Victor.
River's Orange.	Balgowan.	

PEACHES.

Early River.	Grosse Mignonne.	Lord Palmerston.
Early York.	Noblesse.	Salway.
Dagmar.	Miller's Mignonne.	Hobb's Late.
Alexandra Noblesse.	Crimson Galande.	Shap's Late.
Royal George.	Comet.	

PEARS.

Citron des Carmes.	Louis Bonne of Jersey.	Winter Nelis.
Jargonelle.	Gansel's Bergamot.	Chaumontelle.
William's Bon Chrétien.	Beurre Diel.	Nec Plus Meurris.
Flemish Beauty.	Marie Louise.	Uvedale's St. Germain.
Beurre de Capiaumont.	Napoleon.	
Brown Beurre.	Passe Colmar.	

PLUMS.

Early River's.	Damson Prune.	Prince Engelbert.
July Greengage.	Woolston's Black.	Diamond.
Early Orleans.	Jefferson's.	Coe's Golden Drop.
Denniston's Superb.	Kirke's.	White Magnum Bonum.
Golden Esperen.	Washington.	Reine Claude de Barray.
Angelina Burdett.	Denyeres' Victoria.	
Green Gage.	Pond's Seedling.	

FIGS.

Brown Ischia.	White Marseilles.	Brown Turkey.
Green Ischia.	Malta.	

APRICOTS.

Hemskerk	Moorpark.	Peach.

QUINCES.

Apple-shaped.	Pear-shaped.	Portugal.

MISCELLANEOUS.

Black Mulberries.	Loquats.	Lisbon Lemons.

THE RABBIT PEST.

This occurs in New Zealand as well as in Australia. From the few individuals turned loose less than twenty years ago, Mr. Griffin tells us that up to 1882 the increase had been so great that they denuded whole tracts of vegetation, thereby causing the death of hundreds of sheep. One station, usually capable of supporting fifty thousand sheep, was so denuded of vegetation that it would not support six thousand.

The export of rabbit-skins in 1873 amounted to 36,716 in number, valued at $6,062. In 1882 the number had increased to 9,198,837, valued at £88,725, or $425,880.

From the foregoing it will be noticed that while agriculture may not be as far advanced in New Zealand as in some of the other colonies, it is by far the most fertile and productive. In fact, it is the only one of the seven colonies which has both reduced its imports and increased its exports during the ten years, 1877 to 1886. In other words, it is becoming more and more self-sustaining, and bringing the balance of trade more and more in its favor.

TASMANIA.

This island and colony lies between latitude 40° 40′ and 43° 38′ south, and between longitude 144° 30′ and 148° 30′ east, and contains about 24,500 square miles. It was discovered in 1642 by Tasman, and named by him Van Diemen's Land, but this name has since been superseded by the one it now bears, in honor of the discoverer.

A survey of the island was made in 1802, and a penal settlement

established in 1804, the island continuing to be a penal colony until 1853.

The agricultural history of Tasmania begins with the year 1816, when there were but 1,461 white inhabitants on the island. There were 1,054 acres of land under cultivation, 34 horses, 1,956 cattle, 20,501 sheep, and (in 1817) 1,552 swine. In 1853 there was a white population of 65,954. The area of land under cultivation was 116,446 acres. The produce for this year amounted to 715,723 bushels of wheat, 497,162 bushels of oats, 106,213 bushels of barley, 16,990 tons of potatoes. The number of live-stock amounted to 15,455 horses, 91,803 cattle, 1,942,550 sheep, and 28,082 swine. The values of agricultural products for this year were as follows:

Grain, hay, flour, meal, and bran	£266,800
Of fruits, jams, potatoes and other vegetables	48,012
Wool, 5,624,200 pounds, valued at	245,201

In 1887 these statistics were as follows:

Population		142,478
Acres in cultivation		457,436
Wheat produced	bushels	675,069
Oats produced	do	385,195
Barley produced	do	52,240
Apples produced	do	239,904
Pears produced	do	18,125
Potatoes produced	tons	42,526
Hops produced	pounds	567,442
Horses	number	29,528
Cattle	do	147,092
Sheep	do	1,547,242
Swine	do	52,408
Value of exports of grain, hay, flour, meal and bran		£17,155
Value of exports of fruit, jam, potatoes and other vegetables		218,289
Value of hops exported		13,696
Wool exported	pounds	9,740,230
Value of wool exported		£415,425

In point of fertility and productiveness of soil this colony is second only to New Zealand. The mean temperature of Hobart Town is 54.30°. The mean temperature of summer is 62° and of winter 47°. The colony, by reason of its location, escapes the drought and tropical heat of more northern localities, and being too far distant from the Antarctic regions, no severely cold weather is experienced, ice seldom forming below the altitude of 2,000 feet above the sea. From what I myself observed, and granting the correctness of statistical information, the truth of which there is no reason whatever for doubting, I do not believe there is a similar locality, large or small, in the United States, which offers so many natural advantages for grain and sheep raising with so few disadvantages. The surface of the country is rather uneven and thickly wooded, which necessitates clearing the ground before cultivating.

THE CEREAL GRAINS.

Wheat.—The soil and climate of the colony must be very thoroughly adapted to the cultivation of this grain, as it stands second of all the colonies in average yield per acre. The average yield for 1887–'88 was 16.42 per acre, and the average for ten years, 1874 to 1888 inclusive, was 18.06 per acre. The acreage of wheat sown in 1878–'88 was, however, 7,894 acres less than it was in 1878–'79. As a consequence Tasmania imported wheat and flour to the extent of about 328,582 bushels, valued at £58,006. The causes for this peculiar state of affairs are matters which I do not feel called upon to discuss here, but give the following paragraphs from "The Statistics of the Colony of Tasmania for 1887," Robert M. Johnston, Government statistician, without myself either indorsing or questioning their correctness. I can only say that nature appears to have been very liberal with the colony.

Never before in the history of Tasmania has the import of wheat assumed such proportions. It is not a matter of surprise, therefore, that many thoughtful persons should anxiously inquire into the probable nature of the causes which are operating adversely to the cultivation of this most important food product.

My own investigations strongly incline me to regard the decline in wheat growing, not so much to the absence of local skill nor to the want of facilities as regards local means of transit by road or rail, but primarily to the narrowed or doubtful profits consequent upon the vastly-increased area now devoted to the culture of wheat in other parts of the world (America especially), resulting in the keenest competition in the world's great center of wheat consumption—England. This competition is so keen and has been so growing in intensity that the English farmer has been compelled, year by year, to curtail his acreage in wheat in favor of foreign producers, even although the former has the advantage of a much greater yield and the closest proximity to the world's market. * * *

Notwithstanding what has been said it certainly seems to be far from creditable to agricultural enterprise in Tasmania that Victoria, with less fertile soil, showing a very much lower average yield per acre, should, during the last season, have produced 13,328,765 bushels of wheat, equal to 13.07 bushels per head, while Tasmania, with its much higher yield per acre, only produced 675,069 bushels, or 4.8 bushels per head. This is inexplicable when it is considered that Victoria during 1884 exported a surplus of breadstuffs, principally to England, equal to about 126 per cent. above that which is found to be necessary for her own local requirements for food and seed, while Tasmania, on the other hand, shows that her total produce of breadstuffs for the same period is nearly 30 per cent. below the average local consumption for food and seed.

The favorite varieties of this grain are Purple Straw, Farmer's Friend, Golden Drop, and Brenna Velvet. I was informed in Hobart, however, by parties in a position to know, that the seed usually sown was not pure, but very much mixed with other varieties.

Oats.—What has been stated with regard to the adaptability of soil and climate for wheat will apply also to this grain. The acreage in 1888 was 21,169, and the average yield per acre for fourteen years, 1874 to 1888, inclusive, was 25.20 bushels. The decrease in acreage of 1887–'88 over 1878–'89 was 7,633 acres, causing a decrease in the product amounting to 329,792 bushels. The reason for this falling off of the production of this grain is not known to me.

Of the varieties grown, the Potato Oat, Poland, White Tartarian, and Foxtail are the most popular.

Barley.—This is also grown to less extent than formerly, but the decline appears to be more in the yield than in the acreage.

In 1878–'89 the area was 4,040 acres, the product 97,745 bushels, or an average yield per acre of 24.21 bushels. In 1887–'88 the area was 3,760 acres, the product 52,240 bushels, or an average of 13.87 bushels per acre.

The principal varieties cultivated are Cape, English, and Chevalier.

Other cereal grains are not cultivated in the colony.

POTATOES.

It is interesting to note that this crop has steadily increased in importance. The area cultivated in 1887–'88 was 16,394 acres, yielding 42,526 tons, while the area in 1878–'79 was 8,079 acres, yielding 27,257 tons. The export in 1887 amounted to 35,788¾ tons, valued at £85,487.

HOPS.

Hop-growing is quite an extensive industry in Tasmania, the product in 1887–'88 amounting to 567,442 pounds. This, however, was 66,020 pounds less than the product of 1886–'87.

The crop of 1887 was valued at £13,696. The varieties most grown are Golden and Early Grape. The average yield per acre in 1886–'87 was 1,097.87 pounds; in 1887–'88, 1,006.80 pounds. The export for 1887 was 475,030 pounds, valued at £13,696.

HAY.

The grasses used for hay are Perennial Rye Grass, Italian Rye Grass, and Cocksfoot. The number of acres of hay throughout the colony in 1887 was 44,562, the yield per acre being 1.14 tons, the entire product amounting to 50,901 tons. The export of hay and straw amounted to 2,210¼ tons, valued at £3,809.

FRUITS.

Most fruits grow luxuriantly in Tasmania, apples and pears being grown on the largest scale of any; however, small fruits are grown to quite a large extent, and great quantities are used in canning and the manufacture of jams. The amount of raspberries and other fruits used in the manufacture of jams in 1887 was estimated at 1,857,052 pounds, the production therefrom being 2,545,619 pounds, valued at £43,302. Of this product 1,942,623 pounds was exported, the value being £35,647. Besides this industry, a vast amount of fruit is exported in a state termed "pulp," fruit thus prepared being simply parboiled without sugar. The value of this product exported in 1887 amounted to £2,487. Besides this many bushels of apples and pears are exported annually,

both to England and to the other Australian colonies. The export of green fruit to sister colonies in 1887 amounted to 319,229 bushels, valued at £91,767.

APPLES.

The following, selected from a list of one hundred and fifty-six varieties, are the most popular:

Adam's Pearmain.	Scarlet Summer Pearmain.	Pearson's Plate.
French Crab.	Stone Pippin.	Sturmer Pippin.
New York Pippin.	Braddock's Nonpareil.	Scarlet Nonpareil.
Port Dalrymple.	Golden Harvey.	

PEARS

The following are the best grown:

Autumn Bergamot.	Flemish Beauty.	Black Achan.
Beurre de Capianmont.	Josephine de Malines.	Chaumontel.
Beurre Brown.	Vicar of Winkfield.	Eyewood.
Beurre Easter.	Broom Park.	Gabaurell's Seedling.
Bergamot Gansels.	Beurre Diel.	Muirfowl's Egg.
Boné Chretien Williams.	Beurre Bosc.	Winter Nelis.
Crawford.	Bergamot Autumn.	
Caeillac.	Bergamot Orange.	

APRICOTS.

This fruit is grown to a considerable extent, and from personal experience I can pronounce it delicious. The popular varieties are:

Turkey.	Giblin's.	Peach.
Black.	Mansfield's.	
Musch Musch.	Breda.	

And there are some splendid seedlings that have not yet been named.

CHERRIES.

The following are grown:

Elton.	Bigarreau.	Ox Heart.
Fisher's Early.	Morello.	Black Eagle.
Archduke.	Black Jean.	Waterloo.
Claremont.	Early May.	Florence.
Black Heart.	May Dukes.	Kentish.
White Heart.	Amber Hearts.	
Warder's Early Black.	Heart of Midlothian.	

PLUMS.

The following are the best varieties.

Apricot.	Pond's Seedling.	Cape Orleans.
Cherry Yellow.	Goliah.	Precoce de Tours.
Coe's Golden Drop.	Cherry Red.	Purple Imperatrice.
Green Gage.	Cooper's Large American.	Black Diamond.
English Orleans.	Coe's Fine late Red.	
Angelina Burdett.	Fisher's late Green Gage.	

PEACHES.

The popular varieties are:

Merchant Campbell's.	Red Newington.	Allport's Late.
Late Mundi.	Royal George.	Millett's Mignonne.
Shanghai.	George the Fourth.	Early Anne.
Gellibrand's.	Warburton's Admirable.	Bugg's Red May.

There are many seedlings also, but they have not been properly named.

NECTARINES.

These, like grapes, do not succeed well of late years, the climate having gotten too cold for them.

FIGS.

These also, like grapes, do not succeed well of late years on account of the climate having become too cold for them.

MULBERRIES.

The popular varieties are:

Common Black.	Paper-leaved.	White.

CURRANTS.

Dutch White.	Common Red.	Knight's Large Red.
Black Naples.	Dutch Black.	Common White.

GOOSEBERRIES.

Red Rifleman.	Whiksmith.	White Bright Venus.
Yellow Leader.	Plowboy.	Leveller.
London.	White Rifleman.	Catherine.

GRAPES.

The climate has so altered that grapes can only be grown outside in favorable situations, and twenty years ago they grew and ripened there in profusion.

ENEMIES OF FRUITS.

The most destructive pest of the orchard is the codlin moth, which I am satisfied can be successfully fought with arsenical poisons, and the green bug, *Diphucephala splendens*, which I believe can be destroyed by spraying with a solution of pyrethrum and water.

QUEENSLAND.

This is the youngest of the Australian colonies, having been separated from New South Wales in 1859. The latest estimate of its area is 427,838,080 acres, being located between the one hundred and thirty-eighth and one hundred and fifty-fourth degrees of east longitude and the eleventh and twenty-ninth degrees of south latitude, the major portion being between the seventeenth and twenty-ninth degrees of south latitude, and covering an area of 668,497 square miles.

The colony is chiefly a pastoral one, with sheep and cattle stations in every direction. The population in 1873 was 146,690 and the area of land under cultivation was 64,218 acres, devoted to the following crops and producing as indicated below:

Products.	Amount produced.	Acreage.
Wheat.....bushels..	82,381	3,554
Oats.....do....	7,060	353
Barley.....do....	11,760	588
Maize.....do....	845,000	21,140
Other cereals.....do....	356	187
Potatoes.....tons..	6,138	3,609
Hay.....do....	11,544	5,772
Vines.....do....	41,479	364
Green forage.....	.....	1,894
Other tillage.....	.....	27,306

Number of horses in colony	99,243
Number of cattle in colony	1,343,093
Number of sheep in colony	7,268,946
Number of swine in colony	42,899

In 1887 the population of the colony was 366,940. The agricultural condition of the colony for the same year was as follows:

	Acres.
Extent of land devoted to pastures and sown with artificial grasses	13,619
Extent of land under cultivation	205,737
Land in fallow	16,892
Total land under crop	188,845
Wheat:	
Reaped for grain	8,248
Mown for hay	2,145
For green fodder	170
Oats:	
Reaped for grain	550
Mown for hay	8,769
For green fodder	1,194
Barley:	
Reaped for grain	1,165
Mown for hay	240
For green fodder	788
Maize:	
Planted for grain	73,139
Planted for green fodder	743
Rice	515
Rye, bere, and millet	474
Potatoes	6,604
Potatoes, sweet	2,113
Sugar cane	51,815
Arrowroot	174
Tobacco	128
Sorghum	367
Lucerne:	
For hay	13,241
For green fodder	3,122
Panicum:	
For hay	1,234
For green fodder	369
Other sown grasses:	
For hay	105
For green fodder	2,829
Grapes:	
For wine	611
For table use	651
Unproductive	396
Bananas	2,048
Pine-apples	567
Oranges	992
Other crops	818
Gardens and orchards	2,521

The gross products of these were as follows:

Wheat:			Potatoes	tons..	15,661
Grain	bush..	82,308	Potatoes, sweet	do..	15,018
Hay	tons..	3,927	Tobacco, cured leaf	cwt..	424
Oats:			Lucern	tons..	28,941
Grain	bush..	13,343	Panicum	do..	2,104
Hay	tons..	15,881	Other sown grasses	do..	132
Barley:			Wine made	galls..	118,672
Grain	bush..	31,493	Grapes for table use	lbs..	1,765,998
Hay	tons..	911	Bananas	doz..	6,268,652
Maize	bush..	1,631,890	Pine-apples	do..	208,694
Rice	do..	18,856	Oranges	do..	772,380

The numbers of live-stock in the colony in 1887 were:

Horses	305,865	Sheep	12,926,158
Cattle	4,473,716	Swine	73,663

The exports in 1887 amounted in value to:

Hides, skins, and tallow	£200,180	Live-stock	£37,295
Wool:		Preserved meats other than salted	105,340
Clean, 15,209,351 pounds	1,060,712	Grain, pulse, etc	7,062
Greasy, 32,273,575 pounds	1,307,999	Green fruit	24,09
All other	218,226		

THE CEREAL GRAINS.

Wheat.—This cereal has been grown for many years in Queensland; chiefly on the Darling Downs and in the neighborhood of Warwick. The one great drawback to its cultivation is its liability to a disease known as rust. Many attempts have been made to counteract this disease, but the success has been only partial hitherto. Taking a period of ten years, from 1877 to 1886 inclusive, the total gross area sown with wheat was 135,793 acres. Of these 28,051 were mown for wheaten hay, 181 acres were cut for green feed, and 38,267 acres were unproductive. The balance of 69,294 acres was divided statistically into two classes—that which was affected by rust and that which was not. The average yield of what was affected by rust was 10 bushels 44½ pounds; the average yield of what was free from rust was 14 bushels 58⅛ pounds. Taking the yield all round, the average was 12 bushels 51 pounds. Taking the total area sown with wheat and applying to it the test of the total yield, including in the average the entirely unproductive acres, we have an average yield of a little over 9 bushels to the acre. And this last is really the only thorough test as to the profitableness or otherwise of wheat-growing.

The favorite varieties are Defiance, Lammus, Tuscan, Allora Spring, Purple Straw, Talavera, and Indian wheat, which is said to be rust-proof.

Oats.—This grain is sown chiefly for the purpose of raising green feed and making oaten hay. Of the total area sown in 1886, amounting to 11,099 acres, only 138 acres were reaped for grain. These few acres yielded 1,438 bushels, being an average of 10⅔ bushels per acre.

The average yield of oaten hay in Queensland is $1\frac{6}{10}$ tons per acre; in New South Wales, $1\frac{4}{10}$; in Victoria, $1\frac{2}{10}$; in South Australia, $1\frac{1}{10}$; in Western Australia, $1\frac{2}{10}$; in Tasmania, $1\frac{3}{10}$; in New Zealand, $1\frac{2}{10}$.

Barley.—Barley is sown for green feed also, and sometimes for hay. In 1886 768 acres were reaped for grain and yielded 24 bushels to the acre. The Cape is the popular variety sown.

Maize.—This is the chief crop of Queensland in the extent of land devoted to its cultivation. In 1886 there were 76,481 acres planted with this grain, and the yield from 75,566 acres was 1,700,673 bushels. In this crop Queensland has nothing to fear from her neighbors. Some of them do not grow it at all, and none of them, with the exception of New South Wales, to the extent to which it is grown in Queensland. For the ten years, 1877 to 1886, the average yield has been a little over 27 bushels to the acre. The names of the popular varieties of this cereal I was not able to secure.

The average yields of the several cereal grains, and prices obtained in Queensland therefor, are as follows: Wheat, $9\frac{1}{2}$ bushels per acre, valued at 4*s.* to 4*s.* 6*d.*; maize, 26 bushels per acre, valued at 2*s.* 6*d.* to 3*s.* 6*d.*; oats, $12\frac{1}{2}$ bushels per acre, valued at 2*s.* 8*d.* to 3*s.* 3*d.*; barley, $19\frac{3}{8}$ bushels per acre, valued at 2*s.* 9*d.* to 3*s.* 3*d.*; potatoes, 108 bushels per acre, valued at £3 10*s.* to £4 per ton; tobacco, 1,008 pounds per acre, valued at 6*d.* to 1*s.* per pound; cotton, 210 pounds per acre.

Hay.—Queensland occupies a leading position as a hay-producing country from artificial grasses, but improvement in quality and appearance is possible and desirable.

Mr. Frederick Manson Bailey, colonial botanist, states that of about three hundred and sixty varieties of grasses native to Australia, three-fourths are to be met with in Queensland. I have not, however, been able to secure a list of those used for hay.

FRUITS.

Fruit growing in Queensland is a neglected industry, not receiving near the amount of attention it deserves. The home products have to be largely supplemented by importations from the other colonies in order to meet the demand. There are grand opportunities of doing well in this delightful industry for men with a little money and the necessary knowledge and experience. The value of the green fruits, plants, and vegetables imported into Queensland for the period of five years, ending in 1886, was £580,721 from which the colony derived no revenue, these things being admitted duty free. The total value of the green fruits, plants, etc., exported during the same period was only £37,813, leaving a difference between the imports and exports of over £100,000 per annum, the great bulk of which was spent for what might be grown in the colony. Nothing could more strikingly show the existence of a good market for such products, which is the best encouragement to their cultivation. Some of the southern colonies, notably Tasmania,

can produce English fruits more easily and plentifully than they can be produced in Queensland, except on the uplands, but the latter colony grows many things in the shape of tropical and semi-tropical fruits which can not be grown by her southern neighbors at all.

The following fruits grow readily, and with ordinary care to perfection and in abundance: Figs, guavas, custard apples, mulberries, passion fruits, granadillas, bananas, watermelons, mangoes, pine-apples, peaches, nectarines, loquats, and many other tropical and semi-tropical fruits. So varied are the soil and climate in different localities that some kind of fruit is always in season, and there are places where English fruits, such as apples, pears, plums, strawberries, etc., grow to perfection and where the trees bear abundantly.

The following fruits were exhibited in the Queensland conservatory at the Exhibition:

Pine-apple: four samples unnamed.
Large granadilla: three samples unnamed.
Monstera deliciosa: one sample.
Mango: Bataves, Strawberry Alfonso, Bombay, Kysapatee, De Curser Favorite.
Egg fruit: one sample unnamed.
Date plum: Diedie Maru, Nirro, Oval Seedless, Zinge, Kayayune.
Grapes: three samples unnamed and "Black."
Pear: China.
Quince: unnamed.
Peach: Yellow Mendi.
Apple: Hocking's Greening, Ribstone Pippin Striped, Red Dessert, Moll's Royal.
Bananas: Common large, sugar.
Plum: Magnum Bonum.
Cherry: Brazilan.
Guava: one sample.

The following list of blight-proof apples suitable for the colony is given in the Queensland Guide published in 1888 by Mr. Henry Jordan, minister for lands:

Devonshire Quarrenden.	Irish Peach.	Summer Cheese.
Hocking's Greening (?Green Newtown Pippin).	Jupp's Surprise.	Triomphe de Luxembourg.
Hominy.	Northern Spy.	Trivett's Seedling.
Moll's Royal.	Lord Wolseley.	Ward's Seedling.
	Stevenson's Winter.	

A good collection, not so ready to blight as many other sorts, is as follows:

A. and M. Summer Pearmain.	Family.	Maiden's Blush.
Ben Davis.	Gladney's Red.	Peasgood's Nonsuch.
Buncombe.	Horse.	Rhode's Orange.
Bedfordshire Foundling.	Julien.	Rome Beauty.
Carolina Red June.	Kansas Queen.	Shockley.
Carter's Blue.	Jewett's Best.	Stancill.
Cellini.	Kittageskee.	Twenty Ounce.
Equinetelee.	Kentucky Red Streak.	Stirling Castle.
Early Strawberry.	Lord Suffield.	Watson, Carolina.
	Late Wine.	

WESTERN AUSTRALIA.

Time did not admit of my visiting this colony in person, and documents sent me by the colonial officers reached Melbourne after I had sailed for America, and as these were not forwarded to me I am unable to give as much information in regard to the country as is desirable.

In order to form a just conception of Western Australia it is necessary to bear in mind that, although the colony has been founded fifty-nine years, its population only amounts to 40,000, scattered over a territory which in round figures covers 1,000,000 square miles. It is eleven times the size of New Zealand and eight times that of the United Kingdom. When the infinite possibilities of a country so very sparsely settled are taken into account the designation applied to Western Australia as "the Cinderella of the Australian group" is not inappropriate.

About 750,000 square miles of Western Australia are still unutilized, and in great part unexplored. On a rough estimate the whole coast of the colony from Eucla, in the south, to Cambridge Gulf, in the north, may be said to be settled for 50 to 200 miles inland, although a large section of territory taken up, especially in the Kimberley and Eucla districts, has not yet been stocked. North of Champion Bay the lands occupied are held on lease as pastures, but some degree of cultivation extends to Geraldton, in latitude 29°, which is situated in the heart of an agricultural district. The returns of 1886 showed that in that year there were 86,248 acres under cultivation, including vineyards and kitchen gardens. The wheat crop covered 24,043 acres; hay, 25,718; barley, 5,185; and oats 1,766 acres. The squatting leases and licenses in the same year numbered 6,469, extending over 129,219,079 acres, yielding only £73,863 in rent.

The principal industry is wool growing. Good agricultural land, although not continuous in any district, occurs in patches which are often extensive. But the productiveness even of ground which appears nearly pure sand is astonishing, and vines, with garden produce, flourish in it luxuriantly. Already good wine is produced, although not of a uniform standard, and there can be no doubt that Western Australia is destined eventually to be a great wine-producing country.

As the colony made no exhibit of grain or fruits at the Centennial Exposition I can only give here such statistical facts as I have been able to gather from a few documents relating to the Australian colonies in general.

Population in 1873, 25,761; land under cultivation, 51,724 acres.

Products.	Amount produced.	Acreage.
Wheat.....bushels..	345,368	25,697
Oats.....do...	28,330	1,474
Barley.....do...	87,529	5,083
Maize.....do...	2,110	113
Other cereals.....do...	18,243	1,475
Potatoes.....tons..	1,263	473
Hay.....do...	31,882	15,941

In 1886 the population had increased to 39,584. The area of land under cultivation was 86,248 acres, divided among the following products, which yielded as indicated:

Products.	Amount produced.	Acreage.
Wheat.....bushels..	288,516	24,643
Oats.....do...	28,512	1,788
Barley.....do...	82,816	5,185
Maize.....do...	3,933	171
Other cereals.....do...	.....	628
Potatoes.....tons..	1,171	356
Hay.....do...	25,718	25,718

The following will illustrate the increase in the number of farm animals during the same period:

Animals.	1873.	1886.
Horses	26,290	38,369
Cattle	47,640	88,254
Sheep	748,536	1,809,071
Swine	20,948	24,655

The average yield of grain, potatoes, and hay for the same period was as follows:

Wheat	bushels..	11.49	Potatoes	tons..	2.75
Oats	do....	15.93	Hay	do....	1.16
Barley	do....	14.90			

CONCLUSION.

Of the fruit industries I was able to secure no information, and it is doubtful if much is being done in that direction.

In conclusion, I wish to acknowledge the uniform kindness and courtesies extended to me by colonial officials, who left nothing undone that would aid me in my work or add to the pleasure of my stay among them.

To the United States Consul-General at Melbourne, Hon. James P. Lesesne, I am under special obligations, while Hon. G. W. Griffin, Con-

sul at Sydney, New South Wales, and Hon. Charles A. Murphy, Consul at Adelaide, South Australia, rendered me every assistance possible.

To you and your staff I am also greatly indebted for favors by far too numerous to mention.

The statistical matter contained in the foregoing report has been largely drawn from the following documents: "The Victorian Year Books," by Henry Heylyn Hayter, C. M. G.; "South Australia in 1887–'88," by John Fairfax Conigrave; "The Statistics of Queensland," by John G. Cameron, for the under secretary for mines; "The Wealth and Progress of New South Wales," by T. A. Coghlan, A. M.; "New Zealand, her Commerce and Resources" and "New South Wales, her Commerce and Resources," by Hon. G. W. Griffin, United States Consul at Sydney; public documents published under the direction of Sir James Hector, of Wellington, New Zealand, and the works of Baron von Mueller, Prof. Angus MacKay, and Messrs. Fraser S. Crawford and J. G. O. Tepper.

Respectfully submitted.

F. M. WEBSTER,
Special Agent, U. S. Department of Agriculture.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

EPORT UPON EUCALYPTUS AND OTHER WOODS USED IN AUSTRALIA AND NEW ZEALAND FOR PILES, DOCKS, BRIDGES, AND WORKS EXPOSED TO SEA-WATER.

By ALBERT KOEBELE, *Special Agent of United States Department of Agriculture.*

ALAMEDA, CAL., *May 7*, 1889.

SIR: I herewith submit to you my report upon such woods as are sed in Australia and New Zealand in constructing docks, bridges, and ther works exposed to sea-water, and which are partly or wholly free om attacks of the teredo, so troublesome to the present woods used in he United States.

Respectfully,

ALBERT KOEBELE.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

It is to be regretted that the time for investigation and inquiry, in gard to this particular branch, has been very limited on account of e study and introduction into the United States of the enemies of *erya purchasi*, and this report may not prove to be what has been pected on the subject, yet every contribution to it, though ever so tle, is, in my opinion, of great importance to our Southern and West- n States.

The report treats chiefly upon such species of Eucalyptus as could id should be extensively introduced into this country, for nearly all e species, and certainly the hardier kinds, could be advantageously own here. With this timber we would eventually be enabled to se- re piles lasting from thirty to forty wears, or even longer, as is the se in Australia; and the more readily may this be accomplished from e fact that the climates of California and southern Australia are es- ntially the same. Moreover, all the extensive sterile regions in south- n California and Arizona would then become most valuable timber- oducing districts. Among the one hundred and fifty species, or there- outs, of Eucalyptus, certain species can be selected for growth in serts and stony regions; and this would be of great benefit, not only n account of the timber, but on account of the beneficial influence which

would certainly be exerted on the annual rain-fall of the west coast, preventing floods and retaining and increasing our springs and rivers.

The very hardy species can be selected for the more northern and colder parts, viz, *Eucalyptus pauciflora*, *E. alpina*, *E. urnigera*, *E. coccifera*, and *E. vernicosa*, which are all found at altitudes in their native homes that are covered with snow several months in the year. These are rather slow-growing trees compared with some other species, yet the wood would prove excellent for various purposes aside from furnishing a high quality of fire-wood. Many species could be selected for desert regions, chiefly those known as the Mallee, comprising several species, of which *E. oleosa* is famed in the production of the well-known Eucalyptus oil, which oil is furnished in greater or less proportions by all the different species. *E. microtheca* and *E. terminalis* would also admirably fit those regions where the temperature does not fall below 18° F., and not only these but many others could be mentioned as furnishing valuable wood, while the first would produce lasting piles. *E. marginata*, with its indestructible wood for piles, would be fitted for our dry and stony hills throughout southern California and western Arizona, and from such places the best timber is obtained. It probably grows much slower here than on rich soil, for which reason the timber is much superior. It is this species that is selected as teredo-proof in Australia, while piles grown on the plains are more liable to be destroyed. Mr. McLennan, who has charge of the gardens of the University of California, at Berkeley, informs me that "*E. marginata* is a failure there," yet I have not the least doubt that at a greater distance inland, more sheltered from the cool wind, and warmer, it will succeed, and certainly ought throughout the southern part of this State. Mr. Brown, of the Bureau of Forestry, at Adelaide, South Australia, has kindly presented me with seeds of this species, and I will send some, on application, to persons who desire it for trial. *E. leucoxylon*, the Ironbark, would also thrive on such grounds, or, in fact, on any available space. This forms one of the hardest and most valuable kinds of timber; the same may be said of *E. corynocalyx*, which could also be raised in any dry and arid region. This last will prove the best and most lasting for piles. *E. botryoides* could be raised along river banks and in other moist situations; the variety Bangalay is fitted for coast sands, forming a large tree and producing excellent timber. As yet the real value and durability of a comparatively small number of species are known. It is an encouraging fact, as stated by Baron von Mueller, "that piles of *E. marginata*, after being in the water for forty-three years, were found perfectly sound, and that sleepers will last from twenty to thirty years."

Eucalyptus wood is largely used in blocks for paving streets in Australia, that of *E. rostrata* being considered the most durable, and it can hardly be excelled in neatness and durability. Indeed, the city of Melbourne can claim the finest streets on the globe.

I inclose the following letter, written by Mr. K. McLennan, gardener of the University of Berkeley, California:

I do not hesitate to say that the Eucalyptus is one of the most important and interesting genera of forest trees known at the present time, and is less studied, particularly in California, where it succeeds so well and where exists such a growing market for its several uses. Considering the different uses to which the different species can be put, it is but proper to state that they should be extensively studied and planted wherever climatic conditions are favorable to their growth. A careful selection of the various species should be made, and those from the cold and higher altitudes only should be planted northward, while the tender and more delicate varieties should be confined to warmer and more sheltered situations, as they will not stand much frost or high blustering winds. I may also mention that they should be entirely planted by themselves, as there are very few trees and plants that will thrive near Eucalyptus trees. One particular point that came under my notice is that wherever they are planted and grown for six or eight years, and afterwards rooted out, the soil will grow the best of crops. Indeed, I have seen a piece of land where Eucalyptus trees were grown for twelve years after which they were rooted out and the ground planted to Mulberries, which made the enormous growth of from 8 to 10 feet in one season. In conversation with a friend of mine on the subject, he told me of a neighbor of his who had about 4 acres of land that was actually useless for growing any kind of crop on. The idea struck him to plant it to Eucalyptus trees, which he did. After eight years he rooted them all out for fire-wood and planted it to other crops, and now says that it is the best piece of land he has.

While the Eucalyptus draws heavily from the soil wherever grown, I am of the opinion that it leaves a substance that is highly nutritious to other plants.

In the Eucalyptus we have a vegetation absolutely Australian, and which contains a tannate, gum resin, a volatile acid, and a volatile oil which is the most important part and peculiarly of Eucalyptic origin. The *E. amygdalina* is said to yield as high as 50 pints of volatile oil per ton of green leaves; *E. sideroxylon*, 20 pints per ton of green leaves; *E. globulus* or blue gum, 12 pints; *E. obliqua*, 8 pints. I may here mention some of the other properties and uses of the Eucalyptus—the remarkable solidity, hardness, and durability of the timber of some of the species, and the large proportion of potash the ashes contain, which Baron Von Mueller put down at 20 per cent.

The barks of *E. rostrata*, *E. obliqua*, *E. goniocalyx*, and *E. corymbosa* are used for making paper, and the barks of many other species are largely used in tanning. *E. viminalis* and *E. mannifera* yield a substance called Australian Manna. The oil from the Malee or Aleosa is used as a solvent for resins in the preparation of varnishes. The oils of *E. amygdalina*, *E. globulus*, and *E. citriodora* are used for diluting the more delicate oils used in perfumery, etc.

There are about thirty different varieties on the University grounds at Berkeley, ranging from 15 feet to over 100 feet in height, and from about sixteen to eighteen years old. The largest are *E. globulus*, *E. viminalis*, and *E. polyanthenus*. Some of *E. globulus* and *E. viminalis* are over 100 feet in height, and from 2 to 3 feet in diameter. Next comes *E. polyanthenus*, or poplar-leaved Eucalyptus, which measures about 75 feet, and 18 inches in diameter. It is an ungainly looking tree, with a few scanty branches on the very top of it, and is very sensitive to frosts and high winds. *E. obliqua* is a robust, hardy tree and well furnished with both branches and leaves; it is of a medium height, with a diameter of 18 to 20 inches. *E. paniculata* is of medium growth and diameter and does not cast its bark, but is very hardy. *E. augustifolia* is a fair grower and seems to be a straight-grained tree. It also, however suffers from frosts and winds. *E. odorata* is a rapid and straight grower, very handsome, the flowers giving an odor like that of magnolia blossoms. *E. eugemoides* or

Mountain Blue Gum is a very pretty tree with drooping branches and smooth bark, and of medium size. *E. stricta* is erect and dwarf, and almost useless. *E. marginata* is a failure at Berkeley, and I fear that *E. citriodora* will follow in the same wake, although it survived the winter of 1887, which was very severe, and is still living, but looks sickly after it. I regret being unable to determine the remaining twenty varieties on the University grounds, as I have no means by which to do so. I must leave it for some future and more convenient time.

As yet none of the numerous species of Australian insects preying upon the Eucalyptus have to my knowledge been observed in California, and it is not likely that such have been introduced. A few species of our native Coleoptera will feed in their larval state on decaying wood (N. G. W. Harford); this alone would be of great benefit to us, as in Australia a large number of these valuable trees are destroyed by numerous coleopterous and lepidopterous larvæ which bore within them. I have seen samples of wood of *E. rostrata* at the bureau of forestry, at Adelaide, completely riddled with holes made by the larvæ of an immense *Cossus*. Many trees, in the parks of Adelaide, are destroyed by this insect; often hundreds of holes from 1 to 1¼ inches in diameter, or rings of such that had grown over, may be counted on a single individual tree; and I have seen as many as thirty empty pupa cases sticking out of one tree. All parts of the tree are affected, the trunk as well as the larger branches; the young or one-year-old larvæ were observed during November and December coming down from the smaller branches and boring into the trunks and larger branches. They are then scarcely more than an inch in length. There are several species of Cossids just as destructive to the Eucalyptus in Australia, and the larvæ of various beetles also bore into them and destroy them. It is hard to find a healthy *E. globulus* around Melbourne on account of these insects. Particularly should we be on guard here for the numerous *Coccidæ* or scale insects of these trees, some of which would prove very detrimental to timber in a country free of their enemies and parasites. The most destructive of these that come under my observation is *Eriococcus eucalypti*, so numerous occasionally as to cover all the branches on some trees, and such as are covered will almost always die. Two very important insects were observed at Melbourne preying upon these scales, of which one is a moth described by Mr. Weyrick as *Thalpochares coccipnaga*. He found it feeding in larval state upon *Lecanium* infesting a *Macrozamia* at Sydney. It is a very interesting and beneficial insect. I have observed it all over Australia, at Quorn, South Australia, feeding upon a *Pulvinaria;* at Adelaide on various scales, *kermes*, various species of *Lecanium*, several species of *Pulvinaria*, *Icerya*, and others; also in New South Wales and Queensland. In the latter place it had cleaned whole orange trees of *Lecanium hesperidum*. It forms a case over its back with the remains of the scales with which it walks around well protected, in search of food; it was very abundant at Melbourne feeding upon the *Eriococcus*. The other is a small fly bred from these scales at the latter place. There are also numerous other scales and various other insects, more or less injurious, living upon these trees.

EUCALYPTUS MARGINATA.

The *Eucalyptus marginata* ranks amongst the first of all trees for piles, jetties, and other structures exposed to sea-water. It is used entirely in the ports of Adelaide, Melbourne, and Sydney, and, as Mr. W. M. Maskell, of Wellington, informs me, also chiefly in the ports of southern New Zealand. In the northeastern part of Australia some inferior species of *Eucalyptus* grown in that immediate vicinity are used.

In the northern part of New Zealand, the Totarra (*Nageia* (*Podocarpus*) *totarra* Don.) is used. It is a tree growing there to a height of 120 feet with a trunk reaching 20 feet in circumference. It is called Mahogany Pine by the colonists. The reddish, close-grained, and durable wood is easily worked, is valuable both for building and for furniture, and is also extensively used for telegraph posts; indeed, it is considered the most valuable timber in New Zealand. Chosen for piles and bridges, wharves and jetties, and in other naval architecture, the hard wood resists decay and the attacks of the teredo for a long time, according to Professor Kirk. It is also one of the most lasting woods for railway sleepers. When used for piles the bark should not be removed from the timber. This tree, according to Baron von Mueller, "is found in New Zealand, Lord Howe's Island, Juan Fernandez Island, Chili, and Patagonia," and no doubt could be easily introduced into the United States. *E. marginata*, if properly seasoned before use, is almost indestructible in water, nor will the teredo or the chelura attack it. The trees are selected from the dry, ironstone regions, as these furnish the strongest and most durable timber, which is readily distinguished from that grown on plains by the much darker and harder quality. At Port Adelaide, South Australia, most of the piles are 12 by 12 inches, and are not placed in water before being properly dried; after this the space between high and low water mark is sheathed with copper plates (Mon's metal), as these parts only are liable to be attacked. Thus provided, I have been told they will last from fifty to seventy years; yet I observed numerous unprotected piles, which had been in water for thirty-five to forty years and were still sound in the center, and only on the outside, where decay had set in, was the teredo found. November 16, 1888, on a trip from Quorn to Adelaide, I met Mr. A. B. Moneriff, Engineer-in-Chief of South Australia, who has had some experience in this line. This gentleman informed me "that no wood is free from the teredo," yet he admitted having taken up piles that had been in water for twelve years and were found entirely sound. At this place he claimed "the water was very salty, and the teredo rare." He further maintains that the only way to preserve the wood free from the attacks of the teredo is to sheath it with copper metal. Mr. F. S. Crawford, of Adelaide, however, informed me that he had seen a record from the former Engineer-in-Chief, in which the opinion was expressed that those *E. marginata* grown on plains only proved to be attacked, while those from high and dry ground always remained free. This gentleman had always been very careful in the

selection of timber, only taking that grown in dry regions. I made personal investigation and inquiry at Port Adelaide, and came to the conclusion that *E. marginata* would prove one of the most valuable additions in woods to the United States that could be made. There the men were at work in sheathing piles that had been in water two years, and yet not a mark could be observed on them. They looked new. If not properly seasoned before use, however, even the very best timber, I have been told, will in a few years show decay and be attacked by the mollusks; but if the wood remains unprotected (not sheathed), and is kept free from the mussels, *i. e.*, cleaned every few years, it will remain sound for a long period. I have seen here piles of the Sugar Gum, *E. corynoxylon*, which had been in water for thirty-nine years, and yet they were still sound in the center, but on the outer parts, where they were decayed, numerous teredos were found.

I can not do better than abstract from Baron von Mueller's excellent work, "Select Extra-Tropical Plants," of which we have an American edition, issued by Mr. George Davis, Detroit, Mich. This book should be consulted not only on Eucalyptus, but also on other valuable plants suitable for our climate. The valuable work, "Forest Culture and Eucalyptus Trees," by Hon. Ellwood Cooper, of Santa Barbara, Cal., on the germination of seeds and the raising of trees in this country, with much other valuable information, should also be consulted.

EUCALYPTUS MARGINATA, Smith.

This is the Jarrah or Mahogany tree of southwestern Australia, famed for its indestructible wood, which is neither attacked by chelura, teredo, nor termites, is much sought after for jetties and other structures exposed to sea-water; also for underground work and telegraph poles, and is largely exported for railway sleepers. Vessels built of this timber have been enabled to do away with copper-sheathing. For jetties the piles are used round, and they do not split when rammed even into limestone or other hard foundations, provided the timber is of the best hard kind. The clerk of government works at Perth told me that he took up piles in 1877 which were driven for a whaling jetty in 1834, and that the timber was perfectly sound, although the place was swarming with teredo. At the jetty in Freemantle, piles thirty years old, and others one year old, could scarcely be distinguished from each other. The durability of the timber seems largely attributable to kino-red, allied to phobaphen, of which it contains about 15 to 17 per cent. Of kino-tannin it contains 4 to 5 per cent. Sir Fred Abel traces the immunity of this timber from boring animals to the peculiar acid principle contained in this and some allied woods. Timber of a close grain and slightly oily and resinous nature, works well, makes a fine finish, and is by local ship-builders considered superior to either sal, teak, or any other wood, except perhaps English oak or live-oak. In Western Australia it is much used for flooring, rafters, and shingles;

also for furniture, as it is easily worked, takes a good polish, and presents a beautiful appearance. It is not too hard, and hence is more easily worked than *E. redunca* and *E. loxopheba*. The wood from the hills is darker, tougher, and heavier than that from the plains. Well-seasoned timber weighs about 64 pounds per cubic foot; freshly cut, from 71 to 76 pounds. It is one of the least inflammable woods, according to Captain Fawcett, and is locally regarded as one of the best woods for charcoal. Mr. H. E. Victor, C. E., of Perth, estimates the area, covered at present with marketable Jarrah in southwestern Australia, at 9,000,000 acres, and the yield at an average of about 500 cubic feet of good timber per acre. The trees should be felled in autumn or towards the end of summer, in which case the timber will not warp. They grow chiefly in the ironstone ranges. At Melbourne it is not of quick growth, if compared with *E. globulus* or *E. obliqua*, but it is likely to grow more rapidly in mountain regions. Massed in its native country, it presents the features of the east Australian stringy-bark forests. Trunks of this tree have been measured that were 80 feet to the first branches, and 32 feet in circumference at 5 feet from the ground, through the formation of buttresses. To prevent splitting of sawn timber, Mr. Simpson recommends it to be covered up with sawdust.

E. LEUCOXYLON, F. v. Mueller.

This is the ordinary Ironbark tree of Victoria and some parts of South Australia and New South Wales. It attains a height of 100 feet, and supplies a most valuable timber, which shows great strength and hardness, is much prized for its durability, is largely employed by wagon-builders for wheels and poles, by ship-builders for topsides, treenails, rudders (stock), and belaying-pins, and is also used by turners for rough work. It proved to be the strongest of all the woods hitherto subjected to test by Mr. Luehmann and Baron von Mueller, bearing nearly twice the strain of American oak and ash, and excelling even hickory by about 18 per cent. It is much recommended for railway sleepers, and is extensively used in underground mining work. The railway commissioners of Victoria recently reported sleepers laid twenty-four years ago still quite sound. It is likewise very extensively employed for the handles of axes and other implements by Victorian manufacturers. The price of the timber in the log is about 2*s*. 5*d*. per cubic foot in Melbourne; the weight of such, when completely dried, varying from 63½ to 68½ pounds, equal to a specific gravity of 1.024 to 1.106 (F. v. Mueller and Rummel). As the wood of this tree is superior for some purposes to that of almost any other Eucalyptus, its regular culture over wide areas should be fostered, especially as it can be raised on stony ridges not readily available for ordinary husbandry. The wood is sometimes pale, in other localities rather dark. The tree is generally restricted to the Lower Silurian sandstone and slate formations with ironstone and quartz. Nevertheless it accommodates itself to various

geologic formations, even to limestone ground. The bark is remarkably rich in kino-tannin, yielding as much as 22 per cent. in the fresh state, but much less after drying; the fresh leaves contain about 5 per cent. and the dried leaves 9 to 10 per cent. The kino-tannin is not equal in value to Mimosa tannic acid from Acacia bark, but it is useful as a subsidiary admixture, when light-colored leather is not desired. As an astringent drug, the kino is not without importance. Mr. Maiden found it to contain 42 per cent. of tannin. The flowers are sought by bees, even more eagerly than those of most other species of *Eucalyptus*, the resulting honey being excellent (Coleman). *E. leucoxylon* has, next to *E. rostrata*, thriven best about Lucknow (in India), among the species tried there for forest culture.

E. ROSTRATA, Schlecht.

This is the Red Gum tree of the South Australian continent, and it is nearly always found on moist ground with a clayey subsoil, and, with most species of Eucalyptus, is comparatively cattle and sheep proof. It will thrive in ground periodically inundated for a considerable time, and even in slightly saline soils. It attains exceptionally a height of 200 feet with a comparatively slight stem, but is generally of a more spreading growth than the majority of its tall congeners. Professor Tate measured a tree, on Mount Lofty, which showed a stem girth of 25 feet. Mr. R. G. Drysdale, of the Riverina district, observed that an exceptional temperature of 125° Fah. in the shade did not shrivel the foliage of this tree; it has also withstood the severest heat in Algeria better than *E. globulus*, and Dr. Bonavia found it to thrive well in the province of Oude in places where *E. globulus*, *E. obliquar* and *E. marginata* perished under the extreme vicissitudes of the climate. It does not bear cold as well as *E. amygdalina*, succumbing when still young at a temperature below 23° Fah. as observed in Italy by Prince Troubetzkoy. In Mauritius and Réunion it resisted the hurricanes better than any other Eucalyptus. In the latter island the Marquis de Chateauvieux observed it to grow 65 feet in six years, and it is always a more rapid grower than *E. marginata*, but less so than *E. globulus*. It grew also with remarkable rapidity in British Guiana (Jenman). It is recommended as an antiseptic tree for cemeteries in mild climes. The timber is one of the most highly esteemed in all Australia among the Eucalyptus, being heavy, strong, and extremely durable, either above or under ground, or in water. For this reason it is very much prized for fence posts, piles, and railway sleepers. For the latter purpose it will last at least a dozen years, and if well selected much longer. Indeed, Mr. Speight reports that sleepers were found quite sound after being twenty-four years in use. It is also extensively employed by ship-builders for main-stems, stern-posts, inner-posts, dead-wood, floor-timbers, futtocks, transoms, knight-heads, hawse-pieces, cant, stern, quarter, and fashion timbers, bottom planks, breast hooks and *riders, windlass* and bow rails. It should be steamed before it is worked

for planking. It is also largely used for fellies, buffers, and posts, and any parts of structures which come in contact with the ground. It is not surpassed in endurance for wood bricks in street paving and for tramways. Next to Jarrah, from West Australia, this is the best Eucalyptus wood for resisting the attacks of the crustaceous chelura and zimonoria, the teredo mollusk and white ants, and it has the advantage of being considerably stronger, proving equal in many instances to American white-oak. The weight of a cubic foot of absolutely dry wood is from 53½ to 57½ pounds, and equal to specific gravity of 0.858 to 0.932 (F. v. Mueller and Rummel). According to experiments by Mr. Luehmann and von Mueller it is surpassed in resistance to transverse strain by *E. melliodora*, *E. polyanthema*, and particularly *E. siderophoia* and *E. leucoxylon*, though stronger than the wood of many other congeners. Honey, mainly from the flower of this tree, proved of good quality. The kino of *E. rostrata* is far less soluble in cold water than that of *E. calophylla*, and is used as an important medicinal astringent. For other details of the uses of this and some other Eucalyptus trees, see reports of the Victorian Exhibitions of 1862 and 1867, also the Ten Decades of the Eucalyptographia. *E. rostrata* is already spontaneously disseminated in Southern France, according to Prof. C. Naudin, whose important "Mémoire sur les Eucalyptus, 1883," should also be consulted regarding the characteristics, development, hardiness, and uses of Eucalyptus.

E. CORYNOCALYX, F. v. Mueller.

This species is found in South Australia and northwestern Victoria and is called the Sugar Gum tree. It is a timber tree, attaining a height of 120 feet with a length of bole of 60 feet, and circumference at 5 feet from the ground reaching 17 feet. The wood is remarkably heavy, very dense, hard, and strong and less liable to warp than that of many other kinds of Eucalyptus wood (J. E. Brown). It has come into use for fence posts and railway sleepers, naves, and fellies. Its durability is attested by the fact that posts set in the ground fifteen years showed no signs of decay. The tree thrives well even on dry ironstone ranges. The base of the trunk often swells out in regular tiers. The sweetish foliage attracts cattle and sheep, which browse on the lower branches, as well as on saplings and seedlings. Scarcely any other Eucalyptus is similarly eaten (J. G. Brown). In ordinary culture the writer does not find this species of quick growth; but Mr. Brown records that under favorable circumstances it will grow 1 foot a month. It has withstood a temperature of 18° Fah. in the north of France (Naudin), and is one of the most valuable of all trees for the dry and arid regions of South Australia. It has grown 7 to 8 feet in one year at Quorn (J. E. Brown.)

E. BOTRYOIDES, Smith.

This tree grows from eastern Gippsland to southern Queensland. Its vernacular name is Bastard Mahogany, and a variety is called Bangalay,

the latter being generally found on coast sands. It is one of the most stately among a large number of species, remarkable for its dark green, shady foliage. It delights in river banks, but will thrive also in a soil wet with stagnant moisture. Stems attain a height of 80 feet without a branch, and a diameter of 8 feet. The timber is usually sound to the center, adapted for water-works, wagons, fellies, also knees of boats. Posts formed of this are very lasting, as no decay was observed in fourteen years. It is also well adapted for shingles. The Rev Dr. Woolls, Mr. Kirton, and Mr. Reader all testify to its general excellence.

E. GOMOCEPHALA, De Candolle.

This is the Tooart of southwestern Australia. It attains a height of 120 feet, the clear trunk a length of 50 feet. The wood is tough, heavy, and rigid, the texture close, and the grain so twisted as to make it difficult to cleave. It shrinks but little, does not split while undergoing the process of seasoning, and is altogether remarkably free from defects. It will bear exposure to all vicissitudes of weather for a long time, and it is particularly valuable for large scantling when great strength is needed. In ship-building it is used for beams, keelsons, stern-posts, engine-bearers, and other work below the flotage, and is recommended also for supports of bridges, framing of dock gates, and for wheelwrights' work. Indeed, it is one of the strongest woods known whether tried transversely or otherwise (Laslett). It was found to grow in seven years to a good-sized tree in Southern France, as also did the next species as well as *E. diversicolor*, *E. botryoides*, *E. gunnii*, *E. polyanthema*, and *E. viminalis* (Naudin). This species and *E. odorata*, *E. fœcunda*, and *E. decipiens*, thrive best on limestone soil.

E. GUNNII, J. Hooker.

The common form of this tree is known as Swamp Gum tree, the mountain variety as Cider tree. It is found in Victoria, Tasmania, and New South Wales, ascending to alpine elevations. In the low lands along fertile valleys it attains a considerable size and supplies a strong and useful timber. It is this species which survived severe frost at the Kew Gardens. Bees obtain usually much honey from the flowers of this species. Cattle and sheep browse the foliage. The timber is found to be almost equal in strength to that of *E. macrorrhyncha*, *E. rostrata*, and *E. globulus*. The other very hardy species of *Eucalyptus* comprise *E. pauciflora*, *E. alpina*, *E. urnigera*, *E. coccifera*, and *E. vernicosa*, which all reach heights covered with snow several months in the year. The present species succeeded well at Arran (Captain Brown and Rev. D. Landsborough). The percentage of kino-tannin in the absolutely dry bark is from 9½ to 11½ (J. H. Maiden).

E. MICROTHECA, F. v. Mueller.

This species is widely dispersed over the most arid extra-tropical as well as tropical inland regions of Australia, and withstands unscorched

a frequent heat of 156° Fah. in central Australia, yet was not affected by exceptionally severe frost in the south of France when other species suffered (Professor Naudin). It is one of the best trees for desert tracts; in favorable places it grows 150 feet high. The wood is brown, sometimes very dark, heavy and elastic; it is prettily marked, hence used for cabinet work, but more particularly for piles, bridges, and railway sleepers (Rev. Dr. Woolls). It has resisted frost to 18° Fah. in the south of France. The development of this species in southern France and Algeria has been marvelously quick (Professor Naudin).

E. TERMINALIS, F. v. Mueller.

This is the Bloodwood tree of the northern and central part of Australia, closely allied to *E. corymbosa*, attaining a considerable size and thriving even in sandy desert country. The wood is dark red, hard, and extremely tough, particularly fit for boards, as it does not crack. Locally it is used for piles and foundation-blocks of buildings, as one of the best woods there (Th. Gulliver). The tree resists the enormous desert heat of central Australia, where the shade temperature ranges from 27° to 122° Fah., and where the annual rain-fall in some years is only 2 inches, and seldom more than 10 inches. It is particularly adapted for dry tropical climates.

E. SIDEROPHOIA, Benthan.

This is the Large-leaved or White Ironbark tree of New South Wales and southern Queensland, attaining a height of 150 feet. According to the Rev. Dr. Woolls it furnishes one of the strongest and most durable timbers of New South Wales. It is used with great advantage for railway sleepers and for many building purposes, and is likewise highly appreciated by wheelwrights, especially for spokes, besides being well adapted for tool handles and various other implements. It was found by Baron von Mueller to be even stronger than hickory, and only rivaled by *E. leucoxylon*. Being harder than the wood of *E. leucoxylon*, it is worked with more difficulty. The Melbourne price of the timber is about 2*s*. 6*d*. per cubic foot in the log. The tree yields much kino. Mr. Newberry obtained from the bark 8 to 10 per cent. tannin. This species is often confounded with *E. resinifera* in culture.

E. AMYGDALINA, La Billardière.

It is found in southeastern Australia. Vernacularly known as Brown-and-White Peppermint tree, Giant Gum tree, and as one of the Swamp Gum trees. In sheltered, springy forest glens it attains, exceptionally, a height of over 400 feet, there forming a smooth stem and broad leaves, producing also seedlings of a foliage different from the ordinary form of *E. amygdalina*, which occurs in more open country, and has small, narrow leaves, with a rough brownish bark. The former species or variety, which might be called *Eucalyptus regnans*, represents probably the loftiest tree on the globe. Mr. G. W. Robinson, surveyor, measured a tree at the foot of Mount Bon-Bon, which was 471 feet high. Another

tree in the Cape Atway ranges was found to be 415 feet high and 15 feet in diameter where cut in felling at a considerable height above ground. Another tree measured 69 feet in circumference at the base of the stem; at 12 feet from the ground it had a diameter of 14 feet; at 78 feet, a diameter of 9 feet; at 144 feet, a diameter of 8 feet; and at 210 feet, a diameter of 5 feet. Individual Swamp Gum trees have been known with a stem circumference of 56 feet at 5 feet from the ground. The wood is fissile, well adapted for shingles, rails, for inner building material and many other purposes, but it is not a strong wood. That of the smaller rough-barked variety has proved lasting for fence posts. La Billiardière's name applies illy to any of the forms of this species. Young trees raised on rather barren ground near Melbourne have shown nearly the same amazing rapidity of growth as those of *E. globulus;* yet, like those of *E. obliqua*, they are not so easily satisfied with any soil. In the south of France this tree grows to a height of 50 feet in eight years. It has endured the frost of the milder parts of England, with *E. gunnii* and *E. cordata*. In New Zealand it has survived the cold when *E. globulus* succumbed. *E. amygdalina*, *E. urnigera*, *E. coccifera*, *E. rostrata*, and *E. corymbosa* have proved more hardy than *E. globulus*, *E. diversicolor*, *E. resinifera*, *E. longifolia*, and *E. melliosa* at Rome, according to the Rev. M. Gildas, *E. coccifera* being hardier than any of the others. Prof. C. Naudin believes that *E. amygdalina* will prove hardy along the western maritime districts of France as far north as Brittany; the ordinary variety proved also hardy in the mild climate of Arran (Rev. D. Landsborough), and also along with *E. globulus* at Falmouth (G. H. Taylor). The typical rough-barked form endures more frost than the sylvan form *E. regnans*. Mons. F. de Roohemache observes that *E. amygdalina* grows nearly five times quicker in Southern Europe than *Pinus laricis*. The now well-known Eucalyptus oil, the distillation of which was initiated by von Mueller, is furnished in greater or lesser proportion by all the different species. It was first brought extensively into commerce by Mr. Bosisto, who has the credit of having ascertained many of the properties of this oil for technic applications. It is this species which yields more volatile oil than any other hitherto tested, and which, therefore, is largely chosen for distillation. Thus it is also one of the best for subduing malarious effluvia in fever regions, although it does not grow with quite the same ease and celerity as *E. globulus*. The respective hygienic value of various species of Eucalyptus may, to some extent, be judged from the average percentage of volatile oil in their foliage, as stated below, and as ascertained by Mr. Bosisto, at von Mueller's instance, for the Exhibition of 1862:

	Per cent.
E. amygdalina	3.313
E. oleosa	1.250
E. leucoxylon	1.060
E. goniscalyx	0.914
E. globulus	0.719
E. obliqua	0.500

The lesser quantity of oil in *E. globulus* is, however, compensated by the vigor of its growth and the early copiousness of its foliage. The proportion of oil varies also somewhat according to locality and season. *E. rostrata*, though one of the poorest in oil, is nevertheless important for malaria regions, as it will grow well on periodically-inundated places and even in stagnant waters that are not saline. According to Mr. Osborne's experiments, initiated by myself, Eucalyptus oils dissolve the following, among other substances, for select varnishes and other preparations: Camphor, pine resins, mastic, elemi, sandarac, kauri, asphalt, xanthorroca resin, dragon's blood, benzole, copal, amber, anime, shellac, caoutchouc, also wax, but not gutta-percha. These substances are arranged here in the order of their greatest solubility. The potash obtainable from the ashes of various species of Eucalyptus varies from 5 to 27 per cent. One ton of the fresh foliage of *E. globulus* yields about 8½ pounds of pearlash; a ton of the green wood, about 2½ pounds; of dry wood, about 4½ pounds. The kino of *E. amygdalina* is almost completely soluble, as well in alcohol as in boiling water, and contains at an average about 58 per cent. tannin (Maiden). For chemical determinations of tan principles in bark and kino of various Eucalyptus the reader may also be referred to Professor Wiesner's published early observations on material supplied by the writer of this work. For resins, tar, acetic acid, tannin, and other products and educts of many Eucalyptus, see various documents and reports by von Mueller, issued from the Melbourne Botanic Gardens in 1866.

E. OLEOSA, F. v. Mueller.

This is one of the smaller species known as Mallee, extending from east to west Australia through the desert regions. The essential oil, in which the foliage of this species is comparatively rich, dissolves oil and india-rubber without heat, according to Mr. Bosisto; it is also one of the best solvents for amber and other fossil resins. The variety *longirostris* attains a height of 120 feet, with a stem of 70 feet, without a branch, in west Australia, where it is vernacularly known as Morrell. The wood is remarkably hard, splits freely, and is used for spars, rafters, fence rails, wheelwrights' work, and agricultural implements. It is of a red tinge, and sinks in water, even when dry. One thousand pounds of fresh foliage gave, in distillation, 62 ounces of oil (Nitschke), *incrassata* 112 ounces. At Mr. Bosisto's great factory in the Mallee Scrub region, where all four species are promiscuously used, 30 tons of foliage came into distillation every week for several months in the year, the development of oil during autumn considerably diminishing. The average yield is about 1 per cent.

E. GLOBULUS, La Billardiére.

This is the Blue Gum tree of Victoria and Tasmania, but is very rare in New South Wales, growing, however, readily in New England. It is famed all over the world. The tree is, among evergreen trees, of

unparalleled rapid growth, and attains exceptionally a height of 350 feet, furnishing a first-class wood. Ship-builders can get keels of this timber 120 feet long; besides this, they use it extensively for planking and many other parts of their ships. Experiments on the strength of various woods, instituted by Mr. Luehmann and Baron von Mueller, proved the wood of the Blue Gum tree in an average of eleven tests to be about equal to the best English oak, American white-oak, and American ash. The best samples, indeed, carried as great a weight as hickory in transverse strain, the ordinary kind about as much as that of *Eucalyptus rostrata*, and more than that of *E. macrorrhyncha*, *E. gunnii*, *E. stuartiana*, and *E. goniocalyx*, but did not quite come up to the strength of *E. mellidora*, *E. polyanthema*, *E. ciderophloya*, and *E. leucoxylon*. Blue-gum wood is also very extensively used by carpenters for all kinds of out-door work, joists, and studs of wooden houses, also for fence rails, telegraph poles, railway sleepers (lasting nine years or more), and for shafts and spokes of drays and a variety of other purposes. Mr. W. Tait, of Oporto, has recommended the wood for wine-casks, and these require no soaking. The price of this timber in Melbourne is about 1*s.* 7*d.* per cubic foot, the weight of the latter, when absolutely dry, being from 43 to 46 pounds, equal to a specific gravity of 0.698 to 0.889 (F. v. Mueller and Rummel). In Southern Europe the *E. globulus* has withstood a temperature of 19° Fah., but succumbed at 17° Fah.; it perished from frost at the Black Sea and in Turkestan, when young, according to Dr. Regel. It has, however, survived severe winters in mild, sheltered places in Cornwall, Hastings, and Dorsetshire (J. Colebrook). The sirocco does not destroy it. In Jamaica it attained a height of 60 feet in seven years on the hills; in California it grew 60 feet in eleven years, and in Florida 40 feet in four years, with a stem 1 foot in diameter. In some parts of India its growth has been even more rapid; in the Hilgiri Hills it has been reared advantageously where *E. marginata*, *E. obliqua*, *E. robusta*, and *E. calophylla* had failed. Its growth was there found to be four times as fast as that of teak, and the wood proved for many purposes as valuable. Trees attained a hight of 30 feet in four years, one tree, twelve years old, being 100 feet high, and 6 feet in girth at 3 feet from the ground. To thrive well there it wants an elevation of not less than 4,000 feet. It has succeeded particularly well at an elevation of from 2,500 to 7,000 feet in Central Mexico (Dr. Mariano Barcena). In Algeria and Portugal it has furnished railway sleepers in eight years and telegraph poles in ten years (Cruikshank). At Urona it grew 15 feet in two years, with irrigation (E. Van Weenen). On the mountains of Guatemala it attained in twelve years a height of 120 feet, and a stem circumference of 9 feet (Boucard). According to the Rev. D. Landsborough it proved hardy in the Isle of Arran. Mr. C. Traill notes it as thriving amazingly as far south as Stewart Island. For window culture in cold countries *E. globulus* was first recommended by Ucke; for culture in hospi-

al wards, to counteract contagia, by Mosles and Goeze. Eucalyptus eaves generate ozone largely, and thus aid in the purification of the ir; the volatile oil is very antiseptic. This tree, particularly when in n unhealthy state, is, at Melbourne, apt to be bored by the larva of a arge moth (*Eudoxyla eucalypti*), and also by two beetles (*Hapatesus irtus*, and particularly *Phoracantha tricuspis*), as noticed by Mr. C. rench. Seeds will keep for several years, admit of easy transmission broad, and generate quickly; but a tree with such rapidity of growth nd of such vast final dimensions wants necessarily soil open to great epth for full scope of its roots to attain unimpaired development. Mr. . Waugh observed in Middle Island, New Zealand, that plants raised rom locally ripened seeds proved hardier than those raised from ordi- ary Australian seeds. The province of Roussillon, after its thousands f years of history, became, in aspect of its landscape, completely hanged within the last few years through Professor Naudin extending hereto, in abundance, *E. globulus*, trees of which, in eight or nine years, ad attained a basal stem diameter of 3 feet. At the height of 2,500 eet on the base of the South European Alps, and in localities too cold or olive culture, *E. globulus* grew to 70 feet high in seven years (Nau- in). Regarding the comparative strength of this and various other imbers, the result of the tests, instituted and tabulated by the carriage- imber board of the Victorian railway department, and greatly under the eadership of Mr. Clement Hodgkinson, may be seen in the Progress eports of the Victorian Royal Commission on Vegetable Products (pp. 77–490).

REPORT ON ICERYA PURCHASI, AND THE INTRODUCTION OF ITS PARASITES AND ENEMIES INTO CALIFORNIA.

By ALBERT KOEBELE, *Special Agent of the United States Department of Agriculture.*

ALAMEDA, CAL., *June* 15, 1889.

SIR: I herewith submit my report upon the study of *Icerya purchasi* in Australia and New Zealand and the introduction of its parasites and enemies into California.

Respectfully yours,

ALBERT KOEBELE,
Special Agent.

Hon. FRANK MCCOPPIN,
U. S. Commissioner.

In accordance with the commission received from the Hon. Norman J. Colman, United States Commissioner of Agriculture, and letter of introduction from Prof. C. V. Riley, U. S. Entomologist, dated July 3, 1888, I left San Francisco on August 25 and arrived at Auckland, New Zealand, on September 14, where some hours could be spent in getting information in regard to Icerya. I therefore visited Mr. W. Will, editor of the New Zealand Herald and Auckland Weekly News who then, and subsequently, on my later visit, gave me valuable information in regard to the occurrence and disappearance of Icerya in the Auckland district, as well as many other points of interest in horticulture; and also Mr. T. E. Cheeseman, curator of the Auckland Museum, who readily accompanied me to a place full of Albizzia (*Acacia*) *lophantha*, Bentham, which had been, about three years previously, completely covered with Icerya. I made a careful search for specimens on these trees, yet only four full-grown females with large egg-sacks could be found. On one of the scales two rather large mites were feeding, attached to the under side; and masses of old and mouldy remains of Icerya were still visible on the trunks of trees.

A residence on which formerly were many orange trees was also visited. There all of the trees had been cut down on account of the numerous scales, and at the time of my visit no Icerya could be found and none were observed during the year, as the proprietors informed

me. No one was able to state the exact reason of the disappearance of the scales; some disease was the supposed cause.

The steamer left Auckland the following day, and arrived in Sydney, New South Wales, September 20. I remained there for four days in search of Icerya. On my first walk a number of them were discovered at the Town Hall premises, infesting a Pittosporum (*P. undulatum*), and the succeeding days a few more were found in one of the public parks, also on a Pittosporum. A large isolated acacia tree was found in front of a private house in the eastern part of Sydney full of the scales; all were full-grown females, with more or less developed egg-sacks, and apparently in a healthy condition. As the trees infested were all inclosed, no proper examination could be made, and the few obtained at the Town Hall showed no trace of parasites then. A trip was also made to Parramatta, about 14 miles to the west of Sydney, to look into some of the orange orchards. I found nearly all the trees badly infested with the red scale (*Aspidiotus aurantii*, Maskell), and still worse with what I considered to be *Mytilaspis gloverii*, Packard. Indeed, some of the trees are completely covered by this latter scale, having the appearance of an old coat of whitewash on the bark, which had partly fallen off. This is produced by the numerous old and dead grayish-white male scales. None of the several orange-growers there visited had ever seen an Icerya or was familiar with the insect.

I left Sydney on the 24th, and arrived in Melbourne the following day, having in the meantime, through the kindness of the United States consul, obtained a free pass over the New South Wales railways, which courtesy was shown me by all the colonies subsequently visited. Indeed, I can not speak too highly of the kindness shown me by all the government officials and of the interest they took in the successful execution of my work. I remained in Melbourne for six days, when I visited Baron Ferdinand von Mueller, to whom I had letters of introduction from Professor Riley. This gentleman assured me that the Icerya never became extensively injurious in Australia, only occasionally, and in certain spots they became numerous, yet always disappearing again. I also met Mr. C. French, Baron von Mueller's assistant, who has had some experience in entomology. He claimed that the scale had been known to him for thirty-four years, yet he had never seen it in large numbers.

At the Zoological Gardens I found on a species of Eucalyptus a Coccid in such numbers as to cover all the larger branches on the under side and partly on the stem. Many of the winged males were secreted amongst the crevices of bark with their two long white setous hairs protruding, feeding upon the scales. Numerous larvæ of a Coleopter were found under chips of bark, apparently a Clerid, to which they bore the closest resemblance. I never met with these larvæ again in my later researches, nor with the Coccid mentioned. A great variety of scales was observed at Melbourne; amongst them the most pernicious,

a species of *Aspidiotus*, deserves attention. This is *A. rossi*, Crawford figured on his plate eighteen of the Coccidæ, but as yet no description has appeared to my knowledge. I have seen olive trees completely covered by this scale; it will attack almost any kind of a tree or shrub as I later observed. Many of the shrubs in the Botanical Gardens in Melbourne infested by this scale were in a dying condition. The introduction of this pest would be a serious consequence to the United States, and we should be on our guard against this as well as a second species of a waxy scale, probably a species of *Cerpolastes*. This last is covered by a thick, smooth, white waxy matter which effectually protects it. Nothing would destroy this scale except remedies against the newly-hatched larvæ, which before they exude any wax are easily killed. The insect was observed all over eastern Australia, and it was numerous in the Botanical Gardens at Sydney and in the woods near Brisbane. At the botanical gardens they could find no remedy except cutting down the infested plants. I recommended a strong resin wash for the newly-hatched larvæ. No Icerya could be found during my short stay at Melbourne.

I arrived at Adelaide, South Australia, on October 2, with letters of introduction to Mr. Frazer S. Crawford, of the Surveyor-General's office, who received me very kindly and promised me his assistance, which promise he honorably fulfilled throughout my stay in Adelaide. I saw the man who discovered the parasites of Icerya (*Lestophonus iceryæ*), and indeed felt very happy when I was promised to be shown a large colony of the scales the following day. Early the next morning Mr. A. Molineux, agricultural editor of the South Australian Register and Adelaide Observer, and proprietor of the Garden and Field, showed me about a dozen orange and lemon trees in a private garden in the suburbs of Adelaide all more or less infested with Icerya, and had been so for the previous two years. The scales were all or nearly all full grown, or rather nearly all of them had begun to exude cottony matter and deposit eggs, yet they were not quite so far advanced as those observed at Sydney.

The very first scale examined contained nine pupæ of the parasitic fly, Lestophonus, and the scale was still living. Nearly all of the many others examined proved to have either larvæ or puparia within them; none of the flies had at that time made their appearance. I attended the gardeners' meeting at Adelaide on October 6, in order to get information as to the occurrence of Icerya, but very few of the gentlemen were acquainted with the insect. To show how rare Icerya is in South Australia, Mr. J. G. O. Tepper, of the Museum at Adelaide, a qualified entomologist who has collected insects all his life, had known Icerya only for the last two years. He never met before this with any specimens in all his trips of collecting through South Australia.

On October 15, I made a trip with Messrs. Crawford and Tepper to North Adelaide where some Icerya were said to exist; we found there

in one garden a few orange and lemon trees with the scales, which were subsequently collected for shipment. In another garden, and also on oranges, an occasional specimen was found. There I discovered for the first time, feeding upon a large female Icerya, the celebrated lady-bird, which will become famous in the United States. I called the attention of both the gentlemen to this insect, yet neither of them had ever seen it, nor knew the beetle. Mr. Tepper has charge of a large collection of insects, and especially Coleoptera, at the South Australian Museum. Mr. Smith, the proprietor of the nursery, also called my attention to a beetle, a curculio, which is very destructive to olive trees, eating the young shoots and leaves of the plants during the night, and secreting itself in the ground during day-time.

Through the Bureau of Forestry, at Adelaide, I was informed that a colony of Icerya existed at Mannum, on the Murray River, and a trip to that place was made on October 18. In two gardens Icerya was present; in one of them they existed on only a few of the many orange trees and none examined showed any parasites, while in the other, on two trees that were infested with the scales, many of them were parasitized. In addition to the parasites, numerous larvæ and eggs of a lace-wing fly (*Chrysopa*) were observed, the larvæ preying upon the scales and chiefly upon their eggs. They were covered so much with the cottony matter of Icerya as to resemble this insect very much, and were difficult to pick out from the torn masses of egg-sacks. I also observed here a coleopterous (Coccinellid) larva, seen before at Adelaide, feeding on the scales, and this proved to be that of the Icerya-feeding Lady-bird. All the scales here, as well as all the predaceous larvæ found feeding upon them, were collected and taken to Adelaide to be shipped to California, together with those found at the latter place. They were kept boxed up in a cool cellar. The scales in Adelaide and suburbs were collected on October 24 and 25 at a place in North Adelaide. Nearly every one of the Icerya exposed to light and sun contained parasites, and many of these had already left, as numerous holes were visible. Of the scales found on a small and bushy mandarin tree, when they were excluded from the sun, only a few contained parasites, but here the larvæ of the Chrysopa were not abundant. Most of the larger egg-sacks of Icerya were torn by them and the contents devoured. I observed also that many of the young scales, only sufficiently large to contain a single puparium of the fly, were infested, the expanded skin of Icerya forming a thin covering over the puparium of the Lestophonus. This had been observed on all places where Icerya occurred. No doubt the eggs of the parasite must be deposited while the scales are yet quite small, probably even before the first month; but surely after this, as the scales will go on feeding and increasing in size until the larvæ within them pupate. At this time large numbers of the scales were hatching and also of the flies. Only one living fly was observed on October 24, while collecting the scales, sitting thrust in between two large egg-masses

and hardly visible to the eye. This and a second specimen taken under similar circumstances were the only ones I observed in nature. I have never met with a single specimen depositing eggs or even sitting on an Icerya or flying around. I concluded gathering for my first shipment on the 25th, and estimated that I had about six thousand Icerya, which in return would produce at an average about four parasites (*Lestophonus*) each. They were packed partly in wooden and partly in tin boxes. Small branches generally full of scales were cut so as to fit exactly lengthwise into the box. With these the boxes were filled and all loose scales placed in between, plenty of space remaining for any of the insects within to move about freely without danger of being crushed by loose sticks. Salicylic acid was used in small quantities in the tin boxes to prevent mould, yet these, as I have later been informed by Mr. Coquillett, had arrived in a more or less mouldy condition, whilst those in wooden boxes always arrived safe. In addition to this Dr. Schomburgh, director of the Botanical Gardens at Adelaide, kindly fitted up for me a wardian case, which was filled up with living plants of oranges and Pittosphorum in pots. Large numbers of Icerya were placed in this, and such larvæ as were found feeding upon them; also some of a Scymnus, only occasionally found with Icerya, yet very abundant on various Eucalyptus scales, especially on *Eriococcus eucalypti*. Of this I sent large numbers to California in my later shipments, as they were easily collected by the hundred under bark of Eucalyptus infested with this Eriococcus. Mr. F. M. Webster brought me the same insect in numbers from Tasmania, together with the Eriococcus on Eucalyptus. The object of this was to have the Lestophenus go on breeding within the case during the voyage. No doubt many infested scales arrived in Los Angeles. I found on examining the tree on April 12, 1889, under which the case had been placed with a tent over it, that from several of the Iceryas the Lestophonids had issued. This case, as Mr. Coquillett informed me in his letter of November 30, arrived in good condition, except that the putty had been knocked off in several places, leaving holes large enough for the parasites to escape. Before opening the case he found two Coccinellid larvæ crawling on the outside and these when placed with the Icerya attacked them at once. He further said that there were only about half a dozen Lestophonus observed within the case, and as near as he could judge, these species of Coccinellid larvæ and about half a dozen living Chrysopa adults. This would show that the Lestophoni were still issuing on their arrival here, and all turned out more favorably than I had anticipated on seeing the box handled in such a rough manner by the steamer hands at Sydney where I accompanied this as well as all the subsequent shipments. I expected little good would come out of this method of sending things, and therefore concluded to send only small parcels on ice, hereafter, as was done partly at the first. If once the insects could be placed in good condition in the ice-house on

the steamer just before leaving, where a temperature of 38° Fah. at first, and about 46° Fah. at the arrival in San Francisco existed, they must arrive safely. To accomplish this, the parasites with their hosts were all collected the last three days before leaving Adelaide, and on arriving home were immediately placed in a cool cellar. On the trip from Adelaide to Sydney, which takes two days by train, my insects came generally in an ice-box on the sleeping-car.

On November 2, I made a trip to Gordon, 11 miles north of Sydney, Mr. James Harold, agricultural reporter of the Town and Country Journal, Sydney, having furnished me with the address of a prominent fruit-grower there. Mr. Harold has traveled much over Australia in gathering information for his paper, yet, as he assured me, he never met with an Icerya. The same answer was received from a gentleman at Gordon, who had been living in the colony for thirty-four years and has raised oranges for thirty-two years. He knows only the three scales upon oranges, viz, *Lecanium oleæ*, and the *Mytilaspis* and *Aspidiotus aurantii*. This latter is not doing any serious damage to his trees, providing they are well taken care of, yet he assured me that in some parts of the colony it is impossible to raise oranges on account of the ravages of this scale. For the *Mytilaspis* he uses sulphur and lime as a wash, applying it with a paint-brush. This, he claims, need only be repeated every three years, as during this time the trees remain comparatively free. The mixture is prepared in the following way: Unslacked lime two parts; sulphur one part; water is poured on this in sufficient quantities to boil and unite with it. It is applied as a whitewash on the trees, and to prevent injury it should not be too strong. Besides the scales, the aphis appears occasionally on orange and peach trees. Two beetles are numerous and destructive to the melon vines here. One of them found at the time is a *Diabrotica*, often perceived by Mr. Crawford, of Adelaide, as doing great injury to the melon tribe. This gentleman, however, claims to avoid all injury by dusting powdered lime over the plants. The beetles, he said, will not attack leaves thus treated. I found here, as well as all over Australia and New Zealand, the woolly aphis (*Schizoneura lanigera*), yet they could be seen only on the branches, as all, or nearly all, the apples raised in Australia and New Zealand are grafted onto blight-proof stock. For this purpose the Northern Spy, of our continent, is considered the best; next comes the Majetin, as Mr. Will, of Auckland, informed me. The Irish peach was standing completely free of aphis, between badly-infested trees. A large number of blight-proof trees are sold by nurserymen in Australia and New Zealand, and only such are planted in these countries as far as the roots are concerned. Mr. Will said that the Northern Spy will produce the best roots; on this is grafted the Majetin as the stem, and any desired variety may be selected for the upper part or branches. At this place I observed a small black and lemon-yellow lady-bird feeding upon the Woolly Aphis; the same was also ob-

served at Tooroomba, Queensland, amid similar circumstances. I did not meet with it outside of these places. No Icerya could be found among the orange trees, yet during the same day two young specimens were found in the woods about two miles distant, one of them on a pea-vine and the second on a species of *Smilax*, both near the ground.

November 5, I visited Mr. Joseph Purser, at Castle Hill, to the west of Sydney, also a prominent fruit-grower. No Icerya were found on the numerous orange-trees at this place. Mr. Purser reports of having met with an occasional specimen only on his orange trees, never more than half a dozen. A short distance from the orchard I noticed a small pond on the edge of which were growing a few small bushes of acacia. On examination I found two large Iceryas with egg-sacks and several empty skins of scales. Mr. Purser informed me that in former years he had often seen the scales upon trees growing along river banks. During this same day, while searching through the bushes, I found upon the needle-bush (*Hakea acicularis*), growing among numerous *Acacia longifolia*, a well-developed Icerya, fastened to the main stem. A careful search was made on all the plants growing there, yet, with the exception of a peculiar Cœlostoma upon acacia, no other scale could be found. One specimen of Icerya had been found on this acacia at the Botanical Gardens in Adelaide. Mr. Purser, who is also much troubled with the *Mytilaspis* mentioned, used as a remedy kerosene tar, 1 pint, soft soap, 3 pounds, sulphur, 5 pounds. These are boiled in 10 gallons of water, and the trees washed with this mixture with a paint-brush, only the trunk and larger limbs being treated. The gentleman claims that all the scales on trees so treated will flourish, and the trees will remain free of scales from seven to nine years.

I returned to Adelaide on November 8, as that was considered the best field to obtain the desired material. On the 15th a trip was made about 300 miles north of Adelaide, but I found nothing of interest in the insect line on this journey, with the exception, along the road, of large numbers of locusts traveling south in search of food, nothing being left for them in the interior to feed upon. The country around Quorn was so dry and hot that some *Eucalyptus rostrata* in a dry river-bed were all the green vegetation that could be seen, and the three specimens of locusts still met with were unable to hop. Finding the search for Icerya in this district useless, I returned to Adelaide where subsequently new colonies were discovered for shipment. In conversation about the grasshoppers en route, a gentleman remarked that only in such unusually dry seasons as the present would the locusts migrate, there being no food left for them in the interior of South Australia. Those around Quorn, he remarked, left in a southeasterly direction down the valley toward Adelaide, whilst those coming from the interior went toward Spencer's Gulf. On my trip I observed them most abundantly about Black Rock traveling south, not in clouds, but scattered and never very high, similar to our *Caloptenus devastator* in California in 1885.

November 20, I began collecting material for my second shipment. Already on some of the trees well exposed to sun about 90 per cent. of the flies had left the scales, whilst on trees in more shady places more than half of the parasites were still within their hosts. Not a single fly was observed and yet they must have been about in large numbers. Instead of this I noticed sitting and walking about the scales a peculiar chalcid. This was suspected to be a secondary parasite, and during the day I noticed them ovipositing in the infested Iceryas. The Lady-birds were at this time quite abundant in egg, larva, pupa, and imago states, and special pains were taken not to miss any of these during the collecting. The following four days were spent in gathering Icerya and its enemies. Many of the secondary parasites were again noticed, yet not a single Lestophonus. I gathered during this time probably six thousand scales, and hardly a specimen was noticed amongst these that was not parasitized by the Lestophonus. All of them had either puparia of the fly or empty holes where the flies had issued. Knowing that if we should introduce the secondary parasite the good work of Lestophonus on Icerya would be greatly restrained, I sent the following notice to Mr. Coquillett, and also to the United States Entomologist:

On account of a parasite of *Lestophonus iceryæ*, remove the infested scales that I send from the tree they were placed on after six weeks and transfer into large glass jars; examine daily by stupefying the insects that have issued with chloroform or ether; empty contents on table; pick out the flies and destroy their parasites. Form a new colony with every consignment you receive.

Professor Riley, in his letter of January 3, in regard to this secondary parasite, writes:

The parasite bred from Kermes and the one from confined Icerya, and which you think to be parasitic upon Lestophonus, are different species of the same genus. The genus is an entirely new one belonging to the Chalcid subfamily *Elasminæ*. This subfamily is an extremely interesting one, and up to the present time has contained only the typical genus *Elasmus*, so that this finding of a new genus is important. *Elasmus* contains both secondary and primary parasites, so that it will be necessary to secure pretty good evidence regarding this new form before we can accept it as either one or the other.

From these probably seventy-five specimens of Kermes or Lestophonus were bred. On the 26th I left Adelaide, on my way to Sydney, with what I considered even a better shipment than the first. Unfortunately this lot arrived in a bad condition at San Francisco, owing to a gale on the route, when the parcels fell off the shelving in the ice-house, in which they had been placed, and most of them were crushed by cakes of ice falling on them. In my opinion, even such severe treatment as this would not destroy so very many of the pupæ of Lestophonus, which are not soft, and if crushed out of the scale will produce flies, if properly taken care of later, as I had ample opportunity to observe while in Australia.

Amongst this lot were also about fifteen hundred eggs of the *Chrysopa*, which were collected on kangaroo acacia (A. armata) infested by a *Dactylopius*, which is often taken to be Icerya. The scale is sometimes

undant that the plants are entirely covered with them. This was ase on my visit, and, as Mr. Crawford informed me, was also the in 1882. Mr. Maskell, to whom specimens were forwarded by Mr. vford, said that the insect belongs to the *Dactylopinæ*. The eggs he *Chrysopa* were so abundant that often from twenty to thirty l be counted on a single small outer branch of a few inches in length, nany of these had already hatched. The number of Lady-birds, l stages, sent with this lot amounted to several hundred. The ther was unusually hot during two days of collecting; the thermom- registered 108° Fah. in the shade, and from one small box left in m over night where the temperature had not been below 90° Fah., t fifty of the flies had issued during the night and early morning. were crawling on the window at 6 a. m. Many more were found in the box with wings not yet developed.

returned again to Adelaide within four days, the time taken in ing the trip. I wrote to the United States consular agent, Mr. ge Harris, at Brisbane, Queensland, to ascertain for me the occur. e of Icerya in that district. Through the Department of Forestry delaide I was informed that Icerya existed at Stansbury, on the Peninsula, at the place of Mr. F. Wurm. Accordingly a trip made across the water on October 1, and I was kindly and hospita- eceived by Mr. Wurm. That gentleman showed me a small orange completely covered with Icerya, but aside from this not a single imen could be found for miles around, nor had they ever been ob- ed before this. The tree infested with the scales was completely red with a small black ant, so much so that several could be counted n each of the scales at the same time. Upon examination only two imens of the Icerya were found to have been parasitized by the ophonus, and these had already left. No doubt the abundance of ants upon the scales prevented the flies from ovipositing. I recom- ded keeping the ants off of the tree, and the scales would then ppear. How often must the mother flies have been hovering over young tree in their attempt to lay eggs, and how many of them t have been carried off as food for the young of the industrious . . Mr. Wurm also informed me that Icerya had been found by him n the roots of black-grass. On examination, however, this proved e an entirely different Coccid (*Lecanium oleæ*) which had found its to the place already in small colonies on olive trees. This seems ly as bad as the house-fly (*Musca domestica*), as this insect did not ear on the peninsula until a few months after residing there, as the tleman informed me, yet swarms of meat-flies were present on arrival. The cut-worms had done considerable damage to fruit s, grape-vines, and other vegetation during November. Some of apple trees were completely stripped of their foliage. Melolonthid æ had been very injurious to the wheat crop by eating the roots. common grasshopper was also in abundance here.

On December 6, from four large specimens of Icerya that had been inclosed, thirty four flies (Lestophonus) and five parasites of the latter had issued. Examined condition of Icerya on place from where last sending was made and nearly every one of the old and infested scales had been removed. The trees at the time were full of young Iceryas, yet at this date but very few of them were left, the Coccinellid larvæ and the Chrysopa in conjunction doing good work, eating no doubt the healthy as well as the infested scales; some of them have apparently gone through second moult, yet the greater part of them were still in the first stage.

Only very small larvæ of the Lestophonus were found within scales after first and second moults. Within a nearly full-grown specimen, which was on the trunk of a lemon tree (the only one there found so large), two larvæ of the fly were nearly full-grown.

I left on December 10 for Melbourne, seeing that it was necessary to hunt up a new field. There I had hopes of gathering sufficient quantity for a shipment. The largest colony I was able to discover at Melbourne existed in a church-yard on Collins street upon small trees of *Pittosporum andulatum*. I could not find the proper person to apply to for admittance, and a policeman whom I consulted in regard to getting the tempting specimens advised me "not to jump the fence, as they surely would give me up."

I left them undisturbed and went in search of others. A few specimens existed in the gardens of the government buildings, an occasional specimen in the park adjoining the Exhibition grounds, some on a hedge in front of a hotel, and single specimens were found on trees in a park at St. Kilda, while at the same place on a garden hedge quite a number were found; all these on *Pittosporum andulatum* and *P.* (*eugenioides*?). On the last-named place the Lady-birds were found at work, and all were gathered later for shipment. I went east of Melbourne as far as Bairnsdale, yet no Icerya could be found. A strong attempt was made to find out the whereabouts of the Monophlœbids, of which Mr. Crawford had sent specimens to California. This could not be discovered in numbers in the woods, yet in the parks at St. Kilda I was soon rewarded by finding the insects looked for, viz, *Monophlœbus, crawfordi*, Maskell, under the loose bark of various Eucalypti imbedded in cottony matter, and the single long (often 2 inches) white setous anal hairs sticking out.* Only a few dozen of the monstrous scale, however, could be gathered in a hard day's work. While up in the tree-tops I found a similar Monophlœbid, only varying in color somewhat. It is as large or even larger than *M. crawfordi*, and sits fastened to the branches and exposed without any cottony attachments, even if sometimes under chips of bark. On my way home in the evening one

* Not mentioned in the descriptions of *Monophlœbus crawfordii*. See "On some New South Australian Coccidæ, by W. M. Maskell. (From the Transactions of the Royal *Society of* South Australia, 1888.)"

of these scales came hurriedly running down on the trunk of a tree. So the next day, at the northern park of Melbourne, the ground at the base of the Eucalypti was examined. Here I found, sometimes lying loose on top and dead, in this case always destroyed by Lestophonus, and below the ground to 3 inches in depth in a small cave nicely imbedded in loose cottony matter if healthy, or generally mixed up with the ground if parasitized, large numbers of these scales. This, as Mr. Coquillett informed me on my return to Los Angeles in April, gave the best results in Lestophonus, as these parasites were still issuing then, four months after they were collected. I have counted as many as sixty-two holes in one of these scales, showing what a number they are able to support. A third species of this large Coccid was found attached to the roots and base of Eucalyptus below ground, even larger than the two preceding. About forty specimens of these produced no parasites. One specimen, probably of this latter species, was found imbedded under bark between the forks of a very large Eucalyptus, about 8 feet from the ground. This measured fully 1 inch in length and was about two-thirds as broad, being nearly round.

I left for Sydney on the 24th to place the insects in an ice-house previous to shipment. In the mean time a letter had been received from Brisbane stating that Icerya occurred there occasionally in numbers, and having had a letter from Professor Riley in which he expressed the hope that I would be able to visit Mr. Carl H. Hartmann, a correspondent of his at Toowoomba, who had found Icerya on his oranges in 1886. I started for Queensland on December 29, and arrived at Toowoomba early on January 1, 1889. During the same day a full-grown female Icerya was discovered in the woods about 3 miles from this place on *Acacia decurrens*, Wildenow. During a search of several hours no other specimens were found. I visited the Range nursery the following day and met the son and brother of Mr. Hartmann, who himself had died from the effects of a fever contracted whilst on a scientific trip in New Guinea. I also met the man who had been employed at the time in 1886 when Mr. Hartmann received an illustration from Brisbane of Icerya and directed him to look over the trees for specimens, where several scales had been found, but since then none. While looking over the lemon and orange trees I found one single, nearly full-grown specimen, but aside from this no trace of them. A peculiar Coccid, resembling Icerya somewhat in structure, was found on an apple tree. The gentleman informed me that Icerya was always most noticeable in wet seasons, yet never appearing in such numbers as to be injurious. I found here in abundance the large hemipterous insect so destructive to orange culture in Queensland and New South Wales. A second species, somewhat smaller than this, yet equally mischievous, was found in Adelaide. Trees were observed at this place with all the fruit and most of the young shoots destroyed. Both species live and grow upon the sap of fruit and slender twigs. *Aspidiotus aurantii* was present here in num-

bers and also *Lecanium oleæ*, both upon oranges; the latter, however, is kept well in check by a lepidopterous (Noctuid) larva, *Thalpochares coccophaga*, Myrick. Several young orange trees had been completely cleaned by this; eight chrysalids of the moth were found upon a young plant. Mr. H. Hartmann also informed me that near Brisbane a dipterous larva existed which occasionally destroys all the orange crops, and in 1886, which had been a very wet season, a dipterous larva destroyed not only this but also nearly all the other fruits, even the apples and pears, yet chiefly first fruit. He also gave me the following list as blight-proof apple-trees: Northern Spy, Majetin, Irish Peach, Streaked Peach, Hartmann's Seedlings Nos. 1 and 5, New England Pigeon, Shepherd's Perfection, Chubb's Seedling, Canvade, Flush Peach.

On January 5, I left Toowoomba for Brisbane. On my arrival at the hotel I met with specimens of Icerya on an ornamental plant in the passage-way. This and a few other specimens found in gardens through the city were all I could find, yet in damp seasons they occur sometimes in numbers, as I learned from several gentlemen acquainted with the insect. Mr. Henry Tryon, assistant curator of the Museum, kindly introduced me to several persons in Brisbane. He himself was about to publish a paper on Icerya and its parasites, of which he has shown me a small chalcid bred in several specimens from Icerya inclosed in a paper box, saying it was a true parasite. I bred this very insect from a few specimens of an Icerya sent to me by Dr. Bancroft, of Brisbane, as feeding upon mangrove tree *Avicennia officinalis*, Linné. This scale differs in coloration from the true *I. purchasi* and may prove to be a new species. Mr. Maskell, to whom the insect was shown, thinks it only a variety. This would be an interesting one, for of all the *I. purchasi* that I have seen, none showed such a uniform bright yellow color. None found on mangrove at Auckland showed such bright yellow color. Mr. Tryon is of the opinion that Icerya originated in China, from the fact that nearly all specimens he found at Brisbane were upon plants of that country. Dr. Bancroft in his paper on Coccidæ (Philosophical Society of Queensland, Vol. I, August, 1869), referred to the then undescribed Icerya, and at that time, as he assured me, he had been acquainted with the insect for several years. The doctor further mentioned the occurrence of a scale on the sugar cane in Queensland, living on the roots of the young plants, and, as these become larger, behind the leaves. It had been imported with the canes from Mauritius. He promised to secure specimens for me. No doubt this will prove to be *I. sacchari*. In the woods around Brisbane but few Coccids were found during my brief stay. The white waxy scale (*Ceroplastes*) so abundant on various plants in cultivation was here observed in large numbers upon a small shrub. Of the Monophlœbids, which I had been informed were almost always numerous around Brisbane, only an occasional specimen could be found.

Everything was so extremely dry that I gave up my intended trip by steamer farther north, and as there was little prospect of obtaining sufficient material for a shipment at this place, I returned slowly towards Melbourne, making occasional stops along the road, yet without discovering any Icerya. At Melbourne I was fortunate in finding many more of the Monophlœbids. On a few trees, under the bark, they occurred by the dozens, often many together, but they were all dried up and the flies had left some time previous. Those in the ground were still in good condition. A large number of them had deposited their eggs and were shriveled up; yet during the two days a fair number was found with parasites. At Sydney from January 21 to 23, a number of Iceryas with parasites and probably two hundred or more of the lady-birds in all stages were collected, most of these in the Town Hall garden. I found here also, feeding upon the scales, a few specimens of a small Scymnus in all its stages, which were inclosed. The first brood of Icerya were found in warm and exposed places at Sydney, and had by this time become nearly grown, some of them beginning to exude cottony matter, where others in more secluded spots were yet quite small. The isolated acacia tree, so full of Icerya in September, has become entirely clear, nothing but a few old and torn egg-masses being visible. With this I finished collecting the parasites and enemies of Icerya in Australia, as from letters received of Mr. Crawford at Adelaide, dated January 11 and 12, there was little hope of obtaining sufficient material at that place for another consignment, nor would it have paid to search for Monophlœbids in the ground, as at the time they could not be found in large numbers in the woods. Moreover, many of their parasites had already left, while the Iceryas still known to me at Melbourne and Sydney were not sufficient to make a good shipment. A letter received at this time from the United States Entomologist, in which he expressed his hope that I would be able to visit New Zealand and study Icerya there until the arrival of the next steamer for San Francisco, was shown to you, and you at once consented to my proposed trip. I therefore left Sydney on January 23 with some hope of clearing up the mysterious disappearance of Icerya in New Zealand. Arriving at Auckland on the 28th, the scales with parasites and lady-birds were repacked from tin into wooden boxes, yet they were found in excellent condition. Everything within the tin boxes had the appearance of having been placed there only a few hours previous. There was no indication of any mould. Some fresh Iceryas found in a private garden at Auckland, on *Acacia decurrens*, were inclosed as food for the lady-bird larvæ. These latter scales were in a small colony all close together on a few small branches, and numbered about eight hundred specimens. No insects preying upon them were found. At the United States consulate a letter was found awaiting me from Mr. R. Allen Wight, dated October 10, 1888, in which the writer mentioned various localities infested with Icerya, wishing me to

visit Hawke's Bay, at Napier, where the scales were still numerous, yet fast disappearing, and a good field for observation would be open. I therefore left Auckland on January 30, overland. On this trip, however, not a great deal of observation could be made.

The cabbage aphis was found in large numbers all over the Northern Island of New Zealand as well as in Australia. A Coccinellid was found subsequently at Napier feeding upon this in large numbers. It is described by Mr. W. Colenso as *C. novæ-zealandica.* About fifty specimens of this were collected and placed in empty pill-boxes. Of these twenty-one were still living on my arrival at Alameda, where they were liberated. A second species was found feeding upon the aphis in small numbers; this is *C. Tasmanii.* The Cabbage Plutella (*Plutella cruciferarum*, Zell.) was here, as well as all over Australia, observed to be very abundant. Mr. French, of Melbourne, had a specimen on exhibition with the name of "Plusia crucifera," as injurious to cabbage. The small Tineid so destructive to potatoes in California, and no doubt already distributed over the most of the Western States, has been known in New Zealand for years, and it is doing the same mischief all over Australia, where it originated. In conversation with a merchant from Denver, Colo., recently, he said that a year ago he received three carloads of California potatoes infested with these worms to such a degree that they could not be sold. I met here, wherever apples are grown, with *Mytilaspis pomorum*, Bouché.

Mr. A. Hamilton, curator of the Museum at Napier, who had been informed by Mr. Wight of my intended trip, awaited me and at once showed me a number of infested acacia trees. Icerya was here still in countless numbers. Before breakfast the next morning this gentleman exhibited one of the Australian lady-birds, saying that he found it amongst Icerya. On investigating, they were found in large numbers in every place visited at Napier and several miles out in the country.

I left Napier for Wellington on the 11th to visit Mr. Maskell. This gentleman had never had the opportunity of studying the enemies of Icerya, as the scales are not found anywhere within 80 miles of Wellington. It had been the firm belief of some persons in New Zealand that certain Ichneumonids were the destroyers of the scales. I have seen dozens of several species of these upon one orange tree infested with Icerya near Napier, not injuring them in any way, but eagerly devouring the sweet exudation from them. Larger numbers of flies were present than Ichneumonidæ, and even Crambidæ were engaged in the same performance, yet these received no share in the compliments. Mr. Maskell had received from the Cape of Good Hope about two hundred specimens of several species of Coccinellids, which, as the sender informed him, were all preying upon Icerya. They were sent to Nelson and placed under a tent with the scales. A few days later, however, the wind took away the tent and nothing more has been seen *since* of the Coccinellids. Several species of these beetles, which Mr.

Maskell kindly presented me with, were left with the United States Entomologist. Amongst them I could not find the *Rodolia iceryæ*, Janson, which is destroying the scales at the Cape, and, with the possible exception of one species, I do not think they will feed upon Icerya. My time was too short to visit Nelson, and Mr. Maskell kindly promised to secure for me a boxful of scales from that district, so as to enable me to find out whether any parasites or enemies existed there. This box was sent to me on board the steamer at Auckland, and on opening the same several flies were found that had issued en route. Only one of them was in perfect condition; all the others were crippled. They had crawled in among the paper used in making up the parcel. No other specimens were bred and no holes were observed on the scales, so the only possibility remains in the larva of this fly being predaceous upon the eggs of Icerya. Apart from these flies no other insects were observed from the Nelson scales.

On my return to Napier I at once proceeded to gather the Coccinellids in all stages. They were in such numbers that I found it not very difficult to collect here about six thousand specimens during the three days (February 14 to 16). As many as eight eggs of the lady-bird were observed on the upper side of a female Icerya just beginning to exude cottony matter. Opposite to this, on the small branch of Acacia, five young larvæ of the lady-bird were feeding on the under side of a half-grown scale; in one instance, even, nine Coccinellid larvæ were found attached to a small Icerya. The mature beetles were not numerous, but every branch full of scales had a greater or less number of eggs and larvæ. The eggs are chiefly deposited among the vigorous half-grown scales. Here the largest number of this and young larvæ were found. They are generally single, thrust in between the scales and fastened onto the branch on the scale itself, often on the under side of this, as the mother lady-bird will sometimes raise the Icerya with her hind legs and thrust the egg under it. At times two or more are found together, always lying flat and in irregular position. Aside from this valuable Coccinellid, a small Scymnus was observed here feeding upon the scales, yet in small numbers only. This has been named for me by Captain Brown as *Scymnus fagus*.

I left Napier with my valuable lot of lady-birds on the 17th. These were placed in the ice-house on the steamer, and as soon as Auckland was reached I went to the freezing-house and there my Coccinellids were placed in a cool room with a temperature of 38° Fah. Having been informed that Icerya had been very numerous almost a year ago at a gentleman's place near Lake Togabuna, several miles out of Auckland, a trip was made as soon as my lady-birds were safe, for I was very anxious to get at the fact as to what had destroyed the scales around Auckland, and if it were not the same insect found at Napier. I was shown a couple of acacia trees, one which had been destroyed by the scales, and a second still living

which had many Iceryas upon it. All the scales on this small tree were examined; with the exception of a small coleopterous larva within one of the egg-masses, no other enemies could be observed. Both these trees were growing among old pine trees and were much shaded by them; in fact so much so that no sun-loving insect, like the lady-bird, would venture into them. Close by about a dozen orange trees were growing in an open field. On my inquiring if no scales were upon these trees, the gentleman remarked that only about nine months since they were full of them, yet all had disappeared. These I wanted to see, and on the first tree reached, while yet in the distance, I could see exposed to the sun on the upper side of the leaf a black glistening spot, which was the insect looked for—the Australian lady-bird. On this tree more Coccinellids than Icerya were found; the Lady-birds, if not at rest on top of a leaf in the hot sun, were busily running or flying about. This is an interesting fact. All the orange trees in the open field were completely cleaned of the thousands of scales by the Coccinellids, while closely adjoining, among the dark and shady pines (*Pinus insignis*, Douglas), a large acacia tree (*Acacia decurrens*) was destroyed by the scales, even the adjoining branches of the pine trees being dead, and, as stated by the proprietor, from the effects of Icerya. As yet the scales have not been observed, to my knowledge, on pine trees in California; yet Mr. Maskell also told me of having seen pine trees loaded with them. I observed here also an *Aspidiotus* very injurious to apple trees. The following day the place visited on my first arrival in Auckland was examined again, but only a few large females could be found. The young were just hatching, yet many eggs were still present. Mr. Cheeseman had been informed by Dr. Purchas and others that Icerya existed abundantly in the woods at the English Church Cemetery (Pureroa), infesting *Sophora tetraptera*. He kindly accompanied me to that place and before long pointed out the tree closely related to acacia. He soon succeeded in finding the scales in large numbers on a few of the trees, when a careful investigation was made and a fews pecimens of the small *Scymnus fagus* were found. A small hemipterous insect was present among the egg-masses in all stages, the young being found within these, and two species of small spiders had built their houses among the egg-masses also. From the many remains of the young Iceryas it was evident that they fed also on these. The Australian Coccinellid had not yet discovered this colony of scales, yet they must have existed in numbers for at least four years. Only a few scattered specimens were found on other shrubs, but they had spread to the mangrove bushes growing close by in large numbers. On this plant they thrive remarkably well. Captain Brown, at Drury, the authority on New Zealand Coleoptera, was visited and asked in regard to the Australian lady-bird. He did not know the insect, nor had he ever met with it, but he had the small *Scymnus fagus*, which seemed to be more widely spread and living upon various scales; neither had he met with the common *C. novæ-zealandica*

which I found at Napier. During a ramble in the woods with the captain I found a large Coccinellid in all stages feeding upon *Ctenochiton viridis*, Maskell, infesting *Coprosma lucida*. This Coccinellid was named for me by him as *Leis antipodum*, Mulsant. Upon the same tree was also found in abundance a second and smaller scale of the same genus; this is *C. perforatus*. The captain kindly promised to send me a number of living specimens of the Coccinellid, and he kept his promise, though unfortunately the insect had become so rare that with assistance he was able to find only six specimens. These came in an ice-chamber, well packed in a large box, but only one of them was living on arrival here.

On February 25, the steamer was ready to sail. Having made arrangements on board, the previous day, as to the most convenient time of placing my insects in the ice-house, they were transferred from the freezing-house on board the steamer, which did not take more than ten minutes, and the insects were not disturbed in their dormant stage during the time. Every day on the voyage I received the answer from the butcher, to my inquiries of the parcel, "Your bugs are all right." On March 10, after leaving Honolulu, one of the boxes with the lady-bird larvæ was examined and found in excellent condition; no dead larvæ could be found among them, and this was twenty-four days after the first were collected. On Saturday evening, March 16, we arrived at San Francisco, too late to have the specimens forwarded, and I could not send them off before Monday evening, March 18. They were probably received and opened by Mr. Coquillett two days later; this would make thirty-four days that they were inclosed, and yet they arrived in excellent condition; better than any previously received. Having been on ice for twenty-nine days, no doubt many of the eggs arrived here before hatching, and the larvæ under such conditions would make little progress in their growth.

As will be seen from these notes, and it is my firm belief, Icerya is indigenous to Australia, having spread from that country to the Cape of Good Hope, New Zealand, and our continent; no doubt with some plants brought here. The pursers of steamers running between San Francisco and Sydney informed me that with every trip a greater or less number of plants are brought over. On these no one would notice Icerya; even an expert would overlook a few of the tiny young scales if not especially searching for them. At the time Icerya was first observed here many oranges were brought over. Mr. Sutton of the Alameda informed me that in 1873 the entire market in San Francisco was supplied with Australian oranges. But this matters little. We know the troubles of the past, and now have the most effective enemies of the causes thereof. Before long the work of these will be appreciated all over the State. At this date small colonies of the lady-bird have been established in almost every district infested with Icerya, and at Los Angeles they must be present already by thousands.

It was hard in Australia to ascertain which was the most effective enemy of Icerya, on account of the scarcity of the latter insect during the unusually dry season of my visit. It is safe to say, however, that the Lestophonids are always and at any time ready for any Icerya, since they breed upon so many and varied scales infesting the Eucalypti and Acacias of which the Australian woods chiefly consist. Often Icerya will appear in large numbers in some private garden in a city, and yet, as I have been informed, they will be out of sight in a short time again. This entire clearing up is the work of the lady-birds, for in most cases the infested scales will produce eggs, and the flies are never able to entirely clear a tree of them, in which case the lady-bird steps in and devours scales, flies, and all. It is only in such protected places that the scales sometimes become numerous, as it takes time for their enemies to establish themselves. The Lestophonus no doubt would in time increase here so as to keep Icerya in check, but this would be years, for only two broods of it were observed in Australia, as many as that of its host the Icerya, the parasite appearing about the same time as the young of the latter. I have seen about eight species of Monophlœbidæ upon which Lestophonus will undoubtedly breed. Dr. Diez of the Adelaide Museum has shown me several specimens of a species of these scales which he assures me were fully two inches in length when received alive from the interior of South Australia. He had written to the party who sent them for information regarding the monstrous scale-bug, yet the only light he received upon the subject was that the discoverer of the scale was found dead in the bushes near Baroota, and he assumes that they came from that district. Such a large Coccid would be able to support several hundred of the Lestophonids. I have also bred this fly from a species of *Cœlostoma*, found on a shrub at Mount Lofty, South Australia, where two specimens of Icerya were found, both infested by Lestophonus, on a species of acacia. In California we have to my knowledge no scales upon which this fly would breed, with the exception of *Pulvinaria* and *Dactylopius*. Of the latter there are many species found almost everywhere; a large species almost equal in size to Icerya exists upon our red-wood trees (*Sequoia*). This no doubt will in time be attacked by the flies. I have not the least doubt that this Lestophonus will do effective work upon Icerya even if slow (too slow for the Americans, as Mr. Wolfskill remarked). So far I have seen little progress of it on my visit to Los Angeles (April 12), and it seemed that very little was remaining of the vast number of flies received here, in good condition. All had been placed under one tent erected over a tree for the purpose of propagating, instead of forming a new colony by every consignment received, as it had been my wish to have done; yet it is to be hoped that very many of the flies escaped out of the tent.

As far as the lady-bird is concerned it will show itself, or rather has done so already. They never were found by the writer except feeding

upon Icerya, and yet there must surely exist in Australia some other scales upon which they feed. The work this little fellow is able to accomplish is shown by the fact that by chance he came over to Auckland, New Zealand, where Icerya was in a flourishing state, having destroyed nearly everything, about five years or so since, and there cleared nearly the whole district around Auckland of it within about two years. From here it had spread south as far as Hawke's Bay without any artificial help, everywhere increasing in numbers as long as the food would last. I shall be greatly mistaken if this one insect alone is not master of the situation within two years' time, although we have comparatively few to battle with. It will need thousands everywhere to clean up the millions of scales. I had no time while in the field to study much of the life history of this so valuable an insect. My first motto was always, "Get as many as possible." If once established here the life history may be studied at leisure. I will relate part of the doings of one pair of these insects. On February 9 a few beetles and pupæ of them had been collected in a glass jar; two male lady-bugs were noticed running and pushing around one of the pupæ in which one of the female lady-birds had just issued, and was within the case with soft and tender wings and about helpless. Soon the male succeeded in pushing her out, and immediately after this had been accomplished one of them united with her at about 3 p. m. This pair were placed in a small wooden box, and they remained in copula until the following morning at 7 a. m. They were left in this box until February 17, when they were placed in a large jar with twigs of acacia full of Iceryas. No eggs were observed in the box, which was thoroughly clean, with the exception of the numerous red spots produced by the lady-birds, for they had subsisted on their own eggs during their confinement. As soon as the female lady-bird was among the scales she became quiet, and stopped and deposited an egg upon the twig. This being done, she turned around and devoured the same, which took her about half a minute. A few moments were then spent in cleaning herself, when again another egg was brought forward and again eaten. After this and another wash she attacked and devoured a half-grown scale. This was eaten into from the back, very quietly at first, yet in a little time she became lively and almost furiously tore the scale off from its hold by the beak, and turned it up and down in the air with the mouth-parts, assisting in this with the anterior legs. In about one minute this was devoured and nothing but the empty skin left, after which she went to work, business like, and deposited eggs quietly, sitting at rest upon the scales, and every few minutes thrusting an egg in between, or generally under them. A very large scale was lifted with the posterior legs and the egg thrust beneath. All the strong attempts at love affairs by the lively and not hungry male were rejected. It was expected that nothing but twigs with Icerya would be selected for food; at least no young larvæ could be observed on them. Yet the second day after the

Coccinellids were placed in with them, young larvæ were seen, and they came out so fast that within a few days my jar was a living mass of them. On February 22, a few of the larvæ were full grown, and settled down in a quiet place, fastening the ends of their bodies down with a thick and sticky substance, and remained in this way, becoming shorter and stouter for four days. On the 25th the first pupa was observed; from this the mature beetle hatched in the evening of the 28th. Another appeared the following day. Again, on March 3, a pair of the bred lady-birds were placed together with clean food, and the next day, March 4, eggs were observed which hatched on the 8th. This I could not carry through as the food began to dry up; in fact, on March 18, many grown and hungry larvæ were devouring each other in this jar, and even the mother of them, which was still living, was noticed devouring one of her young. Three times, at intervals, this pair were observed in copulation. Eleven beetles of this last brood reached maturity, having had nothing to feed upon but one supply of scales that had already been boxed up for eight days, the beetles having been born and forced to live upon themselves. Taking four days for the egg to hatch, about eight days for the larva to grow, three days until pupating, and four days more for the pupa to emerge, this would only make nineteen days from the egg to the mature insect, providing the weather is warm. No doubt we will see cases where in less time than this all the stages are gone through at Los Angeles in hot weather, and we may expect at least fifteen broods annually of this insect, to two of Icerya.

Another most important insect is the moth *Thalpochares coccipliaga*, Myrick, referred to elsewhere (see report on Eucalyptus, etc.). It is to be greatly hoped that this insect will be introduced here. I have been able to get about a hundred larvæ here in good condition, yet what became of them I am not able to state as yet. The insect is apparently easy to breed. Five of the larvæ had been placed in a pill box in the field during January and overlooked. During April, on opening the box at Alameda, I found that four of the moths had issued, copulated, and deposited many eggs. The young larvæ, however, had already left the box and no trace of them could be found. One of the moths was still living at the time. It would have been easy with the number received here, had a little care been bestowed upon them, to breed and introduce them upon most any of our larger scales.

The *Chrysopa*, of which eggs and larvæ were sent over with every shipment, excepting the last, have been successfully introduced. In April, while in Los Angeles, several of the insects were noticed upon orange trees in Mr. Wolfskill's orchard.

Several species of *Scymnus*, about six in number that were sent, all live upon *Coccidæ*. The largest of them was abundant in Brisbane upon various soft scales, and was also found at this place upon Icerya.

Mr. Webster brought to me from Tasmania a boxful of Eucalyptus

twigs with *Eriococcus eucalypti*. The *Scymnus*, so numerous at Melbourne, and sent here in numbers, together with two small moths, a Pyralid and Tineid, were feeding upon the *Eriococcus*. These, as all other insects, were turned over to Mr. Coquillett.

Various other beneficial insects were observed during my four months' work in Australia, all of which if introduced here would be of great value. One of these deserves to be mentioned. It is one of the largest lady-birds and had cleaned whole apple orchards of the woolly aphis in South Australia and Victoria. They were also observed to feed upon *Lécanium*.

All material collected and studied in Australia, relating to this subject and otherwise of importance, will be mounted and sent, with notes thereon, to the United States Entomologist.

ORGANIZATION OF THE MILITARY AND NAVAL FORCES OF VICTORIA.

Compiled by Lieutenant A. MARIX, *U. S. Navy.*

COUNCIL OF DEFENSE.

The Council of Defense was established by the discipline act of 1883, and consists of the minister of defense (president), the naval commandant, the military commandant, the commandant of the naval brigade, and the senior officers, of the metropolitan artillery and infantry.

MILITARY FORCE.

The land forces of the colony of Victoria consist of: Permanent force, militia, militia reserve, and auxiliary force.

A number of British officers, detailed to serve with these forces, compose what is called the "Imperial Staff;" the senior officer being commandant of the forces, and the others are on his staff and act as instructors.

This detail consists of: One lieutenant-colonel, or major, with the brevet rank of colonel. One major of the Royal Artillery, one captain of the Royal Artillery, one captain of the Royal Engineers, one captain of the Royal Infantry, and twelve non-commissioned officers.

The permanent force is composed of the headquarters staff, Victoria artillery, and torpedo corps.

The militia is composed of the cavalry, Nordenfelt battery, field artillery, garrison artillery, engineers (submarine and field companies), infantry, medical staff, and ambulance corps.

The militia reserve is composed of men who have received training in the militia.

The auxiliary force is made up of mounted rifles, rifle volunteers, rifle clubs, and cadet clubs.

TABLE.—*Showing the strength of each corps.*

Permanent force.	Officers.	Warrant officers.	Sergeants.	Rank and file.	Total establishment.
Headquarters staff	5	11	20	.....	36
Victoria artillery	5	2	10	253	270
Torpedo corps	.....	2	4	15	21
					327
Militia:					
Cavalry	3	.....	4	68	75
Nordenfelt battery	1	.....	3	22	26
Field artillery brigade	17	.....	24	229	270
Garrison artillery	32	1	32	657	722
Engineers	8	.....	9	166	183
Infantry	80	4	68	1.848	2,000
Medical arm of service	15	.....	6	32	53
					3,329
Militia reserve	.....	.....	.....	2,000	2,000
Auxiliary forces:					
Mounted rifles	33	.....	55	912	1,000
Rifle volunteers and riflemen in clubs	.....	.....	.....	4,196	4,196
Unattached list, militia	69	.....	.....	.....	69
Unattached list, medical	19	.....	.....	.....	19
					5,284

This makes a total of all the land forces (except the cadet corps, 3,000 strong) of 10,940 officers and men.

ARMS.

The permanent force is armed with Martini-Henry rifles and carbines; principally the latter.

The cavalry, Nordenfelt battery, and field artillery carry carbines. The garrison artillery, engineers, mounted rifles, and riflemen carry the Martini-Henry.

The following is a statement of the number of guns in possession of the land forces:

Garrison guns:
- Breech-loading, rifled, 10 inches 2
- Breech-loading, rifled, 9.2 inches 3
- Breech-loading, rifled, 8 inches 3
- Breech-loading, rifled, 6 inches 7
- Breech-loading, rifled, 5.3 inches 11
- Breech-loading, rifled, 5 inches 4
- Muzzle-loading, rifled, 9 inches 6
- Muzzle-loading, rifled, 80-pounders, 81 cwt 23
- Guns of position—breech-loading, rifled, 40-pounders, 35 cwt 6

Field guns:
- Breech-loading, rifled, 12.5-pounder 18
- Breech-loading, rifled, 12-pounder 6
- Breech-loading, rifled, 6-pounder 6
- Muzzle-loading, rifled, 3-pounder 6

Machine guns:	
Nordenfelt, 10-barrel, rifle caliber	6
Nordenfelt, 5-barrel, rifle caliber	1
Smooth-bore guns:	
Smooth-bore, 68-pounder	18
Smooth-bore, 42-pounder	2
Smooth-bore, 32-pounder	23
Total	151

One Zalinski gun has been ordered and will be mounted at the Heads, the entrance to the bay.

COMMISSIONS AND PROMOTIONS OF OFFICERS.

Commissions are issued, in accordance with and subject to the provisions of the so-called "Discipline Act," to all persons who are to serve above the rank of warrant officer.

The Council of Defense, on the nomination of the commandant, recommends to the Governor in Council competent officers, who have previously served in the British regular or auxiliary forces, or in any colonial militia or volunteer force, who may be considered suitable for appointment in the Victorian military forces.

All such officers are appointed on probation for six months, during which time they must pass certain practical examinations, failing in which their commissions are not confirmed.

Every other candidate for a commission must pass through a "School of Instruction" and receive a certificate of fitness for his branch of the service. On selection, he is posted for six months, during which time he must pass certain technical and practical examinations, failing in which his commission is not confirmed. This probationary term may, however, on the recommendation of the commandant, be extended for a period not exceeding six months.

All recommendations for appointment, promotion, and resignation of officers are made by commanding officers to the commandant, and by the latter, through the Council of Defense, to the Governor in Council.

In the permanent force subaltern officers, on appointment receive £50 for the purchase of uniform.

RETIREMENT OF OFFICERS.

Lieutenants are retired at the age of forty, captains at the age of forty-five, majors at the age of fifty, lieutenant-colonels at the age of fifty-five; but the Governor in Council may, on the recommendation of the commandant, retain any officer on the active list after he has reached the age at which he would otherwise be retired.

Any officer in the militia upon applying may, on the recommendation of the commandant, be placed on the reserve list; and if in the auxiliary force, on the unattached list.

Officers on either the unattached list or in the militia reserve are re-

tired on account of age in the same manner as those on the active list, and their services are at all times at the disposal of the commandant; and officers on the reserve list are eligible to fill vacancies on the active list of the militia.

WARRANT OFFICERS.

The appointment and promotion of warrant officers, gunners, non-commissioned officers, and sappers of the permanent force are under the orders of the commandant. When so appointed they receive a free kit of necessaries and a supply of clothing, as follows:

Free kit (necessaries).

2 flannel vests.	1 brush, hair.	1 razor and case.
3 white shirts.	3 brushes, boot.	1 blacking tin.
3 pairs of socks.	1 brush, shaving.	1 comb.
1 pair of braces.	1 hold-all.	1 pair of gloves.
1 button brush.	1 knife.	3 towels.
1 button stick.	1 fork.	1 sponge.
1 brush, cloth.	1 spoon.	

Free kit (clothing).

1 tunic, blue cloth.	1 cap, forage.	1 helmet, blue.
1 jumper, blue cloth.	2 pairs trousers, blue cloth.	2 khaki covers for helmet.
2 white covers for helmet.	2 suits khaki cotton drill.	2 pairs of boots.

ENLISTMENT OF MEN AND BOYS.

No person can be enlisted unless he is a British subject, and must pass a medical examination in order to enter either the permanent force or the militia, for which two corps recruits are supplied with new articles of clothing if enlisted more than six months prior to the next annual issue; and if available, with part-worn articles if enlisted less than six months prior to the next annual issue.

For the permanent force recruits must be between the ages of nineteen and thirty-five; for the other corps, between the ages of eighteen and thirty-five. But any person who has served in the British army or any colonial force may be admitted if under forty-five. Boys, according to the establishment fixed from time to time, for the purpose of being trained as trumpeters, drummers, buglers, or musicians, may be enlisted if not less than fourteen.

In the auxiliary force every mounted rifleman, on enrollment, is supplied, free of charge, with the following articles, which must be kept in good order, remain the property of the government, and be returned whenever called for: Martini-Henry rifle, complete, with sword bayonet and sling; waist-belt and frog, and bandolier. And on being passed into the ranks he receives in addition, and under the same conditions, regulation bit and bridle, complete, haversack, water-bag, regulation cloak and cape, head-rope, heel-ropes, with straps and peg, wallet, with straps and cloak-straps, and nose-bag.

Every rifle volunteer, on enrollment, is supplied, free of charge, with the following articles, which must be kept in good order, remain the property of the government, and be returned whenever called for: Martini-Henry rifle, complete, with bayonet and sling, waist-belt and frog, bandolier or pouch, haversack, and water-bottle.

The rifle volunteers consist of such members of a rifle club as elect to join that branch of the club, and are approved by the officer commanding the rifle volunteers.

The mounted rifles consist of such members of a rifle club as elect to join the mounted branch of the club, and are approved of by the officer commanding the battalion.

Detachments of rifle volunteers may, on the recommendation of the commandant, be established in any rifle club where not less than twenty members elect to engage, provided that within a radius of 35 miles where rail is available, or 10 miles where rail is not available, a sufficient number of similar detachments can be raised to form a company of not less than one hundred and twenty men.

LENGTH OF SERVICE.

In the permanent force enlistments are for five years, with the option, if approved by the commandant, of extending their service for a second period of five years. In the militia enlistments are for a period not exceeding five years, of which the first three are in the militia and the remaining two in the first-class militia reserve, although, with the permission of the commandant, all five may be served in the militia. Members may, with the sanction of the commandant, re-enlist during the last year of their service for a further period of one, three, or five years.

RESIGNATIONS AND DISCHARGES.

In the permanent force, resignations of officers must be submitted by the commandant, through the Council of Defense, to the Governor in Council, for acceptance. No man can claim his discharge until the expiration of his term of service; but a man of good character may, if he be permitted by the commandant, purchase his discharge during the first three years of service for £20, during the fourth for £10, and thereafter may be granted a free discharge.

In the militia any person may (with the approval of the Governor in Council if an officer, or of the commandant if below the rank of an officer) resign from the militia, and such person pays to the government, for his discharge: £4, if such resignation is tendered during the first year of his service; £2, if such resignation is tendered during the second year of his service; £1, if such resignation is tendered during the third, fourth, or fifth year of his service.

This sum is taken to be as and for liquidated damages due by such person to the government, and becomes due immediately on the accept-

ance of the resignation. But the commandant may, however, remit the whole or any portion of this penalty, on the recommendation of the commanding officer.

In the militia reserve a member can obtain his discharge on the same conditions as a member of the militia.

In the auxiliary force any person may (with the approval of the Governor in Council if an officer, or of the commanding officer if below the rank of an officer) resign by giving fourteen days' notice in writing to the officer commanding his detachment.

DUTY REQUIRED.

In the militia every member of the force must attend in each month at least two parades or drills, of which one is a daylight parade, except in June or July, when both may be evening parades; failing in this, unless on leave, a member is, at the end of the month, put down as "absent without leave." Any member absent without leave for a period of three months is dismissed, unless, in the opinion of the commandant, there be extenuating circumstances.

In order to be classed as "effective," all those on the rolls as combatants on July 1, except commanding officers of corps, and brigade and regimental staff, must attend during that year three whole days, fifteen half days, and twenty-four night drills, and undergo the prescribed gunnery and musketry course; but members who have been absent with leave for a period not exceeding six months, and have during the time present performed the proportionate number of drills, may, with the sanction of the commandant, be classed as "effective."

Recruits passed into the ranks between the 1st of July and 30th of September must attend all these duties. Recruits passed into the ranks between the 1st of October and 31st of December must attend two whole days, twelve half days, and twenty night drills. Recruits passed into the ranks between the 1st of January and 31st of March must attend one whole day, four half days, and twelve night drills. Recruits passed into the ranks between the 1st of April and 30th of June may be classed as "effective," irrespective of the number of drills they may attend.

In carrying out these regulations, one whole day is considered equal to two half days, or four night drills; one-half day equal to two night drills; two half days count as one whole; but no number of night drills are allowed to count for daylight parades.

The duration of parades and drills is as follows: A whole-day parade, not less than eight hours; a half-day parade, not less than three hours; a night-drill parade, not less than one and a half hours.

But should the corps, having assembled, be dismissed through inclemency of weather or other cause before the minimum time be reached, such parade or drill is returned as complete, provided the sanction of *the commandant* is obtained.

The commandant, or officer deputed by him, makes half-yearly official inspections, when every member of the force must be present, unless prevented by sickness or urgent necessity.

Any member of the force, not being a commissioned officer, permanently removed from his district, may, by order of the commandant, be transferred to any arm of the service in the district to which he is removed; and the commandant by general order decides what position such member shall take. Commissioned officers cannot be transferred to another branch of the service except by authority of the Governor in Council.

If temporarily resident in another district, a militia man may, by order of the commandant, be attached to a corps serving in such district, and drills done in such corps are returned to his commanding officer and count towards pay and effectiveness.

Commanding officers have the power to enforce fines, not exceeding the following amounts:

	s.	*d.*
(*a*) For appearing on parade improperly dressed or with clothing, arms, or accouterments dirty	2	6
(*b*) Talking in the ranks	2	6
(*c*) Inattention, and other minor irregularities	2	6
(*d*) Neglecting to notify change of address within fourteen days of such change	2	6
(*e*) Neglect of duty	5	0
(*f*) Leaving the ranks without permission	7	6
(*g*) Minor cases of insubordination	10	0
(*h*) Being absent without leave within the meaning of the regulations	10	0
(*i*) Drunkenness on parade or duty, or in camp, or elsewhere, in uniform	20	0
(*j*) Failing to become effective	20	0
(*k*) Being absent from the half-yearly official inspection	10	0

In (*j*) and (*k*) the maximum fine is obligatory, and cannot be reduced or remitted without the sanction of the commandant.

OFFICERS OF THE MEDICAL STAFF.

The officers of the medical staff of the militia are subject to the orders of the commandant, and are detailed for duty and are under the immediate command of the principal medical officer. When on active service and when the militia is in camp they are employed in general, station, and field hospitals, with troops in barracks or in the field, or on such special duties as the principal medical officer may direct. They are detailed for duty with the various corps, and are required to examine recruits on certain nights fixed by the commanding officer. They are also liable to be detailed for duty in barracks, etc.

In the event of a medical officer being unable to perform any of the foregoing duties, he must either make arrangements with some other medical officer to take his place (informing the commanding officer), or report to the principal medical officer in sufficient time to enable him to provide for the duties.

MILITIA AMBULANCE CORPS.

The militia ambulance corps consists of one surgeon-major, or surgeon, from the fixed establishment of medical officers, who is in command; one sergeant-major (hospital sergeant to the Victorian artillery), who is instructor and quartermaster; one sergeant compounder, two sergeants, three corporals, and thirty-two privates.

This strength may be augmented on occasion of actual service by ten privates from each of the country battalions, who have undergone a course of instruction, and are certified by the medical officer of their respective crops to be efficient.

All drills are carried out under the orders of the commanding officer of the corps, who calls a sufficient number of half-day parades and night drills to enable full pay to be received (as hereafter described). Six night drills in each half year must be devoted to infantry drill.

ORDNANCE, COMMISSARIAT, AND TRANSPORT CORPS.

The ordnance, commissariat, and transport corps of the militia consists of one assistant commissary-general, in command, one deputy assistant commissary-general, one sergeant-major (to be an employé of the ordnance department), two clerks (one sergeant and one corporal), two butchers (one corporal and one private), two grocers (one corporal and one private), two bakers (one corporal and one private), three forage assistants (one corporal and two privates), one foreman of wagoners (sergeant), two cooks (privates), four ordnance storekeepers (two sergeants and two privates), two orderlies (privates), and forty drivers (privates). Total, one sergeant-major, four sergeants, five corporals, and fifty-one privates.

All drills and parades are carried out under the orders of the officer commanding, who calls a sufficient number of half-day parades and night drills to enable full pay to be received (as hereafter described). Six night drills in each half-year must be devoted to infantry drill. The drivers are employed only in camp and when called out for actual service.

BAND OF MILITIA BATTALION.

The band of a militia battalion cannot exceed a total strength of one sergeant, one corporal, and eighteen privates, in addition to the boys allowed. These men must be effective for service, drilled, and liable to serve in the ranks on any emergency. Attendance at band practice counts as drill. Supernumeraries are allowed, provided the cost does not fall upon the effective allowance.

MILITIA RESERVE.

In the militia reserve the service of the officers is at all times at the disposal of the commandant. In order to be classed as effective, they must attend four days at the annual training, or nine half-day

parades during the year. Those officers below the rank of major are attached for duty to such corps as the commandant may direct, and are not allowed to do duty with other corps unless by permission; those above the rank of captain are employed on such duties as the commandant may determine.

All the officers must have performed the drills mentioned above, by the 30th of June in every year, in order to be classed as effective, unless they have joined the reserve during the year; in which case they must have performed a proportional number of drills. But those of the latter class are permitted to perform the whole number of drills requisite for the year. Any officer on the reserve who is not effective is not allowed to retain his commission, unless, in the opinion of the commandant, there are special reasons for the relaxation of the rule.

The militia reserve is divided into two classes. The first-class militia reserves consists of members of the militia who have passed into the reserve after having completed three years' service in the ranks; and of such men passed into the reserve who have been effective in the militia for a period of not less than one year, and are recommended by their commanding officer and approved by the commandant.

A member of the first-class militia, in order to be classed as effective, must attend four days at the annual training, or at nine half-day parades, during the year; and must undergo a special course of musketry or gunnery, which does not extend over a longer period than the duration of three half-day parades and three night drills. All the members who have been transferred to the first-class militia between July 1 and April 30, are required to perform the proportionate number of drills in order to be classed as effective, but may perform the whole number laid down.

Any member of this reserve who fails to become effective is liable to be fined £1 and to be transferred to the second-class militia reserve.

The members of the second-class militia reserve are not liable to be called out for service except in case of national emergency.

Any member of the militia who has been absent for a period of three months may be transferred to this reserve, instead of being dismissed, at the discretion of the commandant.

Every facility is given to men of this reserve to attend annual course of musketry, and they are given the same facilities in purchasing rifles and ammunition as members of the rifle clubs. An extra amount of rifles and ammunition is kept on hand for this reserve, but not regularly issued to them.

AUXILIARY FORCE.

In the auxiliary force all applicants for enlistments in the ranks must attend recruit drill until passed into the ranks.

Rifle volunteers, after being passed into the ranks, are required to undergo a minimum of twelve daylight drills and twelve night drills

per annum. Such drills are held at such time and place as the commanding officer may appoint.

Daylight drills must be attended by two or more detachments of a company; 50 per cent. of the collective strength of the detachments ordered to parade must attend in order that a daylight drill may count towards effectiveness.

No rifle volunteer is classed as effective unless he has completed twelve daylight drills and twelve night drills during the twelve months between the 1st of July and 30th of June in each year, and completed his course of musketry training.

Recruits passed into the ranks between the 1st of July and 30th of September must attend twelve daylight drills and twelve night drills, and must have completed the course of musketry; recruits passed into the ranks between the 1st of October and December the 31st must attend six daylight drills and six night drills and complete the half-year course of musketry; recruits passed into the ranks between 1st of January and March 31, must attend three daylight drills and three night drills and complete the quarterly course of musketry; recruits passed into the ranks between the 1st of April and the 30th June must attend two daylight drills and two night drills.

For the mounted rifles, the amount of service required is the same as for rifle volunteers, except that there are no night drills. Any rifleman who fails to carry out these requirements in regard to drill by the 30th of June, is struck off the list, unless such failure was caused by illness. If temporarily resident in another district, a rifleman may, by order of the commanding officer, be transferred to a detachment serving in such district.

Any officer who does not qualify as effective, is not allowed to retain his commission, unless it be represented by the commandant that there are special reasons for a relaxation of this regulation.

All non-commissioned officers are appointed by the officer commanding the battalion; and any non-commissioned officer who does not qualify as an effective is reduced to the ranks, unless it appears to the commandant that there are special reasons for a relaxtion of this regulation.

After any portion of the battalion has been called out for actual military service, it cannot be released from such service, except by order of the Governor in Council; and, before such portion of the battalion is released from actual military service, it must be returned to the locality to which it belongs.

SYSTEM OF PAY.

In the militia, at the commencement of each fiscal year, commanding officers are credited with 30 shillings per head on the established strength, together with 20 shillings per head for each effective member.

This money is expended for hiring of halls, gas, fuel, furniture, ex-

penses on parades and in camp, battalion bands, and other incidental expenses. The accounts must be carefully kept and regularly rendered.

After being passed into the ranks, members of the militia are entitled to payment for attendance at parades and drills, in every fiscal year, according to the following scale:

Cavalry, artillery, engineers, and infantry.

	£ s. d.	£ s. d.
Boys:		
6 whole days, at 4*s*	1 4 0	
20 half days, at 2*s*	2 0 0	
30 night drills, at 1*s*	1 16 0	
		5 0 0
Gunners and privates:		
6 whole days, at 10*s*	3 0 0	
20 half days, at 4*s*. 6*d*	4 10 0	
45 night drills, at 2*s*	4 10 0	
		12 0 0
Drivers:		
6 whole days, at 11*s*	3 6 0	
20 half days, at 5*s*. 6*d*	5 10 0	
45 night drills, at 2*s*	4 10 0	
		13 6 0
Corporals:		
6 whole days, at 12*s*	3 12 0	
20 half days, at 6*s*	6 0 0	
45 night drills, at 2*s*	4 10 0	
		14 2 0
Sergeants:		
6 whole days, at 12*s*. 6*d*	3 15 0	
20 half days, at 6*s*	6 0 0	
45 night drills, at 2*s*. 6*d*	5 12 6	
		15 7 6
Troop, battery, or company quartermaster-sergeants:		
6 whole days, at 13*s*. 6*d*	4 1 0	
20 half days, at 6*s*. 6*d*	6 10 0	
45 night drills, at 2*s*. 6*d*	5 12 6	
		16 3 6
Troop, battery, and company sergeant-majors and color-sergeants:		
6 whole days, at 14*s*	4 4 0	
20 half-days, at 6*s*. 6*d*	6 10 0	
45 night drills, at 2*s*. 9*d*	6 3 9	
		16 17 9
Brigade or regimental sergeant-majors and quartermaster-sergeants:		
6 whole days, at 14*s*	4 4 0	
20 half-days, at 6*s*. 6*d*	6 10 0	
45 night drills, at 3*s*	6 15 0	
		17 9 0
Lieutenants:		
6 whole days, at 20*s*	6 0 0	
20 half days, at 9*s*	9 0 0	
45 night drills, at 4*s*	9 0 0	
		24 0 0

	£	s.	d.	£	s.	d.
Captains:						
6 whole days, at 30*s*	9	0	0			
20 half days, at 13*s*. 6*d*	13	10	0			
45 night drills, at 6*s*	13	10	0			
				36	0	0
Adjutants:						
6 whole days, at 30*s*	9	0	0			
20 half days, at 13*s*. 6*d*	13	10	0			
45 night drills, at 6*s*	13	10	0			
				36	0	0
Majors:						
6 whole days, at 40*s*	12	0	0			
20 half days, at 18*s*	18	0	0			
45 night drills, at 8*s*	18	0	0			
				48	0	0
Lieutenant-colonels				60	0	0

Submarine-mining company, Victorian engineers.

	£	s.	d.	£	s.	d.
Privates:						
6 whole days, at 10*s*	3	0	0			
20 half days, at 4*s*. 6*d*	4	10	0			
45 night drills, at 2*s*	4	10	0			
				12	0	0
Corporals:						
6 whole days, at 12*s*. 6*d*	3	15	0			
20 half days, at 6*s*	6	0	0			
45 night drills, at 2*s*. 6*d*	5	12	6			
				15	7	6
Scientific electricians:						
6 whole days, at 13*s*. 6*d*	4	1	0			
20 half days, at 6*s*. 6*d*	6	10	0			
45 night drills, at 2*s*. 6*d*	5	12	6			
				16	3	6
Sergeants:						
6 whole days, at 16*s*	4	16	0			
20 half days, 7*s*. 6*d*	7	10	0			
45 night drills, at 3*s*. 6*d*	7	17	6			
				20	3	6
Lieutenants:						
6 whole days, at 30*s*	9	0	0			
20 half days, at 14*s*. 6*d*	14	10	0			
45 night drills, at 7*s*. 4*d*	16	10	0			
				40	0	0
Captains:						
6 whole days, at 45*s*	13	10	0			
20 half days, at 22*s*. 6*d*	22	10	0			
45 night drills, at 10*s*. 8*d*	24	0	0			
				60	0	0

For the first year of service, recruits sworn in between the 1st of October and the 31st of December are not entitled to more than three-fourths, and recruits sworn in between the 1st of January and 30th of June are not entitled to more than one-half of the amount provided in the above scale. Recruits are paid at the rate of 1 shilling *per drill*, on condition of being passed into the ranks.

When undergoing special course of instruction and when called out for actual or temporary service, members of the militia force receive the following daily rates of pay:

	£	s.	d.
Lieutenant-colonels	1	10	0
Majors	1	5	0
Captains	1	0	0
Adjutants	1	0	0
Lieutenants	0	16	0
Quartermaster-sergeants	0	9	0
Sergeant-majors, and quartermaster sergeants (troop, battery, and company)	0	8	6
Sergeants	0	8	0
Corporals	0	7	0
Drivers	0	6	0
Sappers and privates	0	6	0
Boys	0	2	0

When members of the militia are supplied with rations, the actual cost thereof, not exceeding 1 shilling per diem, is deducted from their pay; except in case they are under special course of instruction, or called out for actual or temporary service.

Horse allowance of £50 per annum is paid to each mounted officer, provided he keeps a horse approved as a charger, and such horse must be the bona fide property of the officer. Mounted officers who do not keep horses are allowed the actual amount of horse hire when on drill, not to exceed 15 shillings per day.

Medical officers receive pay as follows: For examination of recruits, 2*s.* 6*d.* a head. For other military duties: Surgeon-majors, £2 10*s.* for whole day and £1 5*s.* for half day; surgeons, £2 for whole day and £1 for half day.

The maximum amount of pay, however, derivable from the various sources cannot exceed, in one year, £60 for brigade surgeon, ranking as lieutenant-colonel; £48 for a surgeon-major, ranking as major; and £36 for a surgeon. Horse allowance is issued to mounted medical officers under the same regulations as to other mounted officers.

In the militia ambulance corps, and the ordnance, commissariat, and transport corps, non-commissioned officers and men receive an allowance of 2*s.* 6*d.* per diem, in addition to the pay of their rank, during encampments or when called out for actual service.

In the militia reserve officers receive the pay of their rank for all duties performed, provided it does not exceed in any one year the amount allowed for four whole days or nine half days. Officers who join the reserve during the financial year cannot receive pay for more drills than the total number allowed for the militia (active list).

A member of the first-class militia reserve receives annually a retaining fee of £3, due on July 1, provided he has been classed as effective on the preceding day, and in that case also receives a bonus of £1 if he has attended the four days' annual (Easter) training.

A member of this reserve who has been transferred to it between July 1 and April 30, and classed as effective on June 30, receives a fee

proportionate to the number of drills he has performed, but no one so transferred after April 30 can receive any fee.

At the commencement of each fiscal year commanding officers are credited with 20 shillings per head for each effective member of this reserve as an allowance for expenses.

Members of the second-class militia reserve, when at any rifle practice or parade, are in every way subject to the provisions of the discipline act, but do not receive any pay except when called out in case of a national emergency.

In the auxiliary force, at the commencement of the fiscal year, commanding officers of companies are credited with the sum of 30 shillings for each effective member, together with 20 shillings for each man passed into the ranks the previous year. The amount so credited is vested in a committee composed of the officer commanding the company and officers or non-commissioners commanding the departments.

The committee establishes a fund for the maintenance of clothing, keeping saddlery in order, and expenses incidental to musketry practice, drills, camps, etc. The accounts must be carefully kept and regularly rendered.

NAVAL FORCE.

The British Admiralty details one captain, three lieutenants, and one warrant officer for three years' service with the Victorian naval force. The senior is in command, and the others are on his staff and act as instructors.

The naval establishment consists of—

1 naval commandant.
1 commander.
1 lieutenant-commander.
3 lieutenant-commanders, or lieutenants.
3 lieutenants.
1 sub-lieutenant.
1 fleet engineer.
1 chief engineer.
5 engineers.
1 staff surgeon.
1 paymaster.
1 clerk.
1 chief torpedo gunner.
2 chief gunners.
1 chief boatswain.
3 gunners, first class.
9 gunners, second class.
1 carpenter, second class.

Making a total of 19 commissioned officers and 17 warrant officers. There are 194 petty officers and men. These form the permanent naval force.

The naval brigade, which to a certain extent corresponds with the militia of the land force, is composed of—

1 captain.
1 commander.
6 lieutenant-commanders and lieutenants.
2 sub-lieutenants.
3 first-class gunnery instructors (permanently attached).
9 gunners.
2 surgeons.
20 engineers.
2 engine-room artificers.
2 chief petty officers.
12 first-class petty officers.
12 second-class petty officers.
311 able seamen.

Making a total of 383.

The naval brigade consists of two divisions, and each division is divided into two subdivisions. Each subdivision is under the charge of a lieutenant.

One division is stationed at Sand Ridge and the other at Williamstown. The headquarters of the brigade are where the commandant directs.

SHIPS AND GUNS.

The Victorian navy is composed of the following vessels:

Iron-clad turret ship *Cerberus*.—Four Woolwich 10-inch; four Nordenfelt.

Wooden frigate *Nelson*.—Two Woolwich 7-inch; twenty 64-pounders; two Gatlings.

Steel gunboat *Victoria* (built by Sir W. Armstrong).—One 8-inch 12½-ton breech-loading rifle; one 6-inch 4-ton breech-loading rifle; two 13-pounder breech-loading rifles; two Nordenfelts.

Steel gunboat *Albert* (built by Sir W. Armstrong).—One 8-inch 12½-ton breech-loading rifle; one 6-inch 4-ton breech-loading rifle; two 9-pounder breech-loading rifles; two Nordenfelts.

Torpedo-boat *Childers*.—Two 1½-inch Hotchkiss.

Torpedo-boat *Gordon*.—Three Nordenfelts.

Armed steamer *Batman*.—One 6-inch 4-ton breech-loading rifle; two Nordenfelts.

Armed steamer *Fawkner*.—One 6-inch 4-ton breech-loader; two Gatlings.

Armed steamer *Garnet*.—One 6-inch 4-ton breech-loader; two Nordenfelts.

Armed steamer *Lady Lock*.—One 6-inch 4-ton breech-loading rifle; two Nordenfelts.

The naval brigade has twenty-eight smooth-bore 32-pounders and two 12-pounder howitzers.

The naval force has four hundred and ninety-three rifles and two hundred and twenty-eight revolvers.

APPOINTMENT AND PROMOTION OF OFFICERS.

In the Victorian naval service, the word "officer" applies to all commissioned, warrant, and subordinate officers, but does not extend to petty officers.

For the permanent force, on the nomination of the naval commandant, the Council of Defense recommends for engagement, to the Governor in Council, competent officers who have previously served in the British regular or auxiliary forces, or in any colonial naval force, and who are considered suitable for appointment or promotion, and who have passed the medical examination.

The naval commandant can retain junior officers in lieu of senior ones, until they become qualified, to fill vacancies in higher grades

Candidates for appointment as sub-lieutenants, having not less than four years' sea time, and under the age of thirty years, and who hold a lieutenant's commission in the British navy, or a master's certificate in the British mercantile marine, may be engaged as sub-lieutenants, on probation for six months, during which time they are required to pass the examinations in gunnery, torpedo, and other subjects, as ordered by the officer commanding the Victorian naval forces.

Sub-lieutenants, after being confirmed in that rank, are eligible for

promotion to the rank of lieutenant as vacancies occur, but they are required to requalify in gunnery and torpedo subjects every three years.

The officer commanding the Victorian naval forces may extend the term of probation to one year.

Men selected for promotion to the rank of warrant officer are required to pass the examination laid down in the British regulations.

For the naval brigade, the Council of Defense, on the nomination of the commandant, recommend to the Governor in Council candidates who may be considered suitable for appointment as officers in the naval brigade. All such candidates are appointed on probation for six months, during which time they must pass such nautical and practical examination as may by general order be directed, failing which their commissions are not confirmed. The time of probation, however, may be extended on the recommendation of the commandant, for a period not exceeding six months. During the time of probation officers receive acting commissions. All officers on entry, or petty officers on promotion to warrant officers, are paid an allowance for uniform, as follows:

	£.	s.	d.
Commissioned officers on entry	18	15	0
Warrant and subordinate officers on entry or promotion to that rank	16	0	0
Engine-room artificers on entry	7	10	0

Arrangements are made for attaching officers on probation, if they desire it, to the permanent force for instruction in their duties, on the recommendation of the naval commandant. The period of instruction does not exceed one month.

Lieutenants who have passed through the instructor's class, and of not less than eight years' seniority in that rank, are eligible for promotion to the rank of lieutenant-commander.

All recommendations for appointment and promotion are made by the commanding officers to the commandant.

Before promotion to the rank of sub-lieutenant or lieutenant, candidates are required to pass a professional examination; although, on the recommendation of the commandant, they may be promoted without such examination.

The promotion of officers who fail to pass the required examination within a reasonable time is canceled.

ENGINEERS.

Engineers must produce certificates showing that they are competent to take charge of the boilers and machinery of any of the vessels of the Victorian navy.

No engineer is eligible for promotion to chief engineer unless he holds a first-class certificate.

Engineers not holding first-class certificates as such, rank junior to those who do, until fully qualified.

RETIREMENT OF OFFICERS.

In the permanent force lieutenants are retired at the age of forty-five, commanders at the age of fifty, captains at the age of fifty-five, engineers at the age of fifty, and warrant officers at the age of fifty. But the Governor in Council may, on the recommendation of the commandant, retain an officer on the active list after he has reached the age at which he would otherwise be retired.

Any officer may, on applying, and with the recommendation of the commandant, be placed on the unattached list. Officers on the unattached list receive no pay, unless special authority is given; their services are at all times at the disposal of the commandant; and otherwise, except those on the staff, they are not required to perform any duty.

Lieutenants and lieutenant-commanders, on retirement, receive a step of honorary rank, with permission to wear the uniform, provided they have eight years' service, not under the rank of lieutenant.

In the naval brigade officers are retired at the same age as in the perpermanent force, and the Governor in Council may retain on the active list any officer who would otherwise so retire.

Officers, not under the rank of lieutenant, after ten years' commissioned service in the naval forces are allowed to retire, with permission to retain their rank and wear their uniform.

Any officer may on applying, and with the recommendation of the commandant, be placed on the unattached list. Officers on the unattached list do not, as such, receive any pay.

The services of unattached officers are at all times at the disposal of the commandant. Unattached officers do not perform any duty unless ordered to do so by the commandant.

Lieutenants and lieutenant-commanders, on retirement, receive a step of honorary rank, with permission tc wear the uniform, provided they have eight years' service, not under the rank of lieutenant.

ENLISTMENT OF MEN AND BOYS.

All candidates must pass a medical examination.

For the permanent force, boys are enlisted between the ages of fifteen and seventeen, and if found qualified at the age of nineteen to perform the duties of "training seamen" they may be rated as such. Boys are sworn in for one year.

Seamen between the ages of twenty and twenty-five years are enlisted as training seamen on probation for six months, and if they are found suitable, they may be sworn in to complete a term of five years from date of joining.

Training seamen who, at or before the completion of their five years' engagement, are found competent, may be rated as able seamen, and sworn for a further term of five years. They may also be retained as training seamen, provided the total number does not exceed the establishment by law.

Seamen to fill vacancies for able seamen can be selected. Able sea-

men cannot be enlisted above the age of thirty-five. No seaman or others below the rank of petty officer, except artisans and servants, can be re-enlisted above the age of forty; and no petty officer can be re-enlisted above the age of forty-five.

All petty officers, seamen, and others, except cooks, stewards, boys, and naval apprentices, are sworn in for five years.

For the naval brigade, enlistments are for one year. No person can be enlisted unless he is a British subject and between the ages of nineteen and thirty-five. But persons who may have been in the British regular or auxiliary force, or in any colonial naval force, may be admitted if under forty.

Boys not exceeding two for each division may be enlisted between the ages of fourteen and seventeen. All applicants for the naval brigade, besides being required to pass a medical examination as heretofore stated, must produce certificates of good character, or otherwise satisfy the commanding officer that their character and conduct have been good.

Every member is supplied with a uniform, which must be kept in good condition, fair wear and tear only being excepted.

RESIGNATIONS AND DISCHARGES.

In the permanent force the resignation of an officer must be accepted by the Governor in Council.

Boys who do not qualify as training seamen at the age of nineteen are discharged.

Seamen who do not qualify at the end of their six months' probation as training seamen are discharged.

Petty officers, seamen, and others below the rank of warrant officer are permitted, subject to the approval of the commandant, to purchase their discharge on the following terms: With less than three years' service, £10; with over three and under four years' service, £5; with over four years's service, nil.

In the naval brigade an officer, with the approval of the Governor in Council, or one below the rank of an officer, with the approval of the commandant, may resign or obtain his discharge, when not called out for actual service, on the payment of £2.

The commandant has the power to discharge any member, not an officer, on attaining the age of forty-five years.

RANK AND COMMAND.

The officers of the permanent naval force are divided into two branches, viz, a military and a civil branch.

The military branch, comprised of the under-mentioned officers, ranks in the following order:

Commandant.	Lieutenant.	Chief boatswain.
Captain.	Sub-lieutenant.	Gunner.
Commander.	Chief gunner.	Boatswain.
Lieutenant-commander.	Chief torpedo gunner.	Midshipman.

The civil branch consists of the under-mentioned officers, and they rank in the following order with officers of the military branch:

Denomination.	Service.	To rank with—
Inspector of machinery	Of eight years	Captain of three years' seniority.
Do	Under eight years	Captain under three years' seniority.
Paymaster	Of fifteen years	Commander, according to date of commission.
Fleet engineer		Do.
Chief engineer	Of ten years	Do.
Staff surgeon		Lieutenant-commander and lieutenant over eight years' seniority.
Paymaster	Over eight, under fifteen.	Do.
Chief engineer	Under ten	Do.
Paymaster	Under eight	Lieutenant under eight years' seniority
Surgeon		Do.
Assistant paymaster		Do.
Engineer	Of eight years	Do.
Do	Under eight years.	Sub-lieutenant.
Chief carpenter		With, but after, sub-lieutenant.
Carpenter		With, but after, gunners and boatswain.
Clerk		Midshipman.

Notwithstanding the relative rank and authority conferred on officers of the civil branch, they are in all such matters and details as relate to the service on which they are employed, and to the discipline and interior economy of ships, subject to the authority of the officers of the military branch; and in no case can they be deemed to be superior in rank, or take precedence of the officer appointed to command the ship or establishment in which they are employed, or the officer or other person on whom the command of such ship or establishment may properly devolve in the absence of the officer appointed to the command thereof.

Officers of the civil branch cannot assume any military command whatever, either afloat or on shore; but under the commanding officer they have all the necessary authority in their own departments and according to their relative rank, for the due performance of their respective duties, and they must be obeyed accordingly by their subordinates

In the naval brigade, as in the permanent force, all commands belong to the senior combatant officer present.

Officers of the brigade rank with British officers, or with the officers of the permanent and militia forces, according to rank and date of commission.

DUTY REQUIRED.

For the permanent force, monthly returns of drills and inspections are sent to the naval commandant from each ship and from the officer instructing the torpedo class.

Boys and apprentices are under instruction, either in seamanship, gunnery, or torpedo work, at least two hours every day excepting Saturdays and Sundays.

Training classes for gunnery and torpedo instructors and men are regularly organized.

In the naval brigade, recruits, until passed, are required to attend two drills per week, at least, as well as the drills afloat; and if they do not make such progress as to satisfy the commanding officer, are liable to be dismissed upon his recommendation.

Every member of the brigade is required to drill twenty-five days in each year, which is made up of one hundred and fifty hours, exclusive of reviews.

The term "effective" means having attended, afloat and ashore, three-fourths of the time laid down for drill and instruction.

There must be two reviews a year, either afloat or ashore, and all members of the brigade must attend one of such reviews.

Every member failing to comply with this is liable to be fined 20 shillings.

In addition to these, all members must attend any inspection that may be made by the officer commanding the imperial naval forces, providing such inspection is not called for more than once a year. The penalty for non-attendance at such inspection is 20 shillings.

The following drills must be performed in order to entitle members to the retainer or allowance: First quarter, three half days afloat, 12½ hours; drills ashore, 25 hours; total, 37½ hours. Second quarter, two whole days afloat, 16 hours; drills ashore, 21½ hours; total, 37½ hours. In addition there are two extra days afloat to complete the Easter cruise. Third quarter, three half days afloat, 12½ hours; drills ashore, 25 hours; total, 37½ hours. Fourth quarter, three half days afloat, 12½ hours; drills ashore, 25 hours; total, 37½ hours.

These hours of drill are exclusive of reviews or inspections called by the officer commanding imperial naval forces.

Should Easter fall in the first quarter of the year, the drills detailed above for the second quarter are performed in the first quarter, and *vice versa*. Every member of the brigade must be present during the Easter cruise, excepting those who are prevented by reason of sickness, in which case a medical certificate must be produced, or those who can give a satisfactory reason for their absence to the commanding officer.

The yearly musketry instruction at the butts takes place during the first or second quarter, according to the date upon which Easter Monday may fall, or the commanding officer determines.

Absentees may make up for lost drills, so as to be entitled to their retainer.

Members who have passed the musketry course are allowed facilities to pass as trained men in the use of the breech and muzzle loading guns, Nordenfelt guns, rifle, cutlass, and single-stick. They are then required to drill on shore only once a week for one and a half hours, besides the drills afloat.

If temporarily resident in another district, a brigade man may, by order of the commandant, drill with the division of that district.

When the commandant, or officer deputed by him, makes the half-yearly official inspection of the brigade, or a detachment thereof, every officer, warrant officer, petty officer, and seaman must be present unless prevented by sickness or urgent necessity. In the former case, a certificate from the officer in medical charge must be produced; in the latter, leave may be granted by the officer commanding, but only in urgent cases. Any member not attending one of such inspections during the year is liable to a fine of £1.

In the event of any member becoming physically unfit for duty, the commandant may cause a medical board to assemble to report upon such member, and upon their recommendation may deal with his case.

The time during which a member of the naval brigade is absent from drill on account of sickness or accident does not count as part of the drill, unless such sickness was caused by injuries received on active service, in which case the naval commandant can grant him leave of absence not exceeding six months; and for this period he receives his retainer, providing that he performs the proper proportion of drills during the remainder of the year. On being removed from the sick-list, he must perform the proper term of drill required.

ENGINEERS.

Engineers and engine-room artificers must appear in uniform at either of the brigade drill-rooms at least once a month, and report themselves to the senior officer present.

Due notice is given them when their services may be required afloat, and those selected must repair to the vessels to which they are appointed.

MEDICAL OFFICERS.

The medical officers are subject to the orders of the commandant, and detailed for duty by and under the immediate command of the principal naval medical officer. When on active service or in camp they are employed in general, station, and field hospitals, and on all such special duties, in camp or on board, as the principal naval medical officer may direct.

Medical officers are detailed for duty with the various divisions and subdivisions, and on application of the commanding officer perform the following duties:

Examination of recruits on certain nights fixed by the commanding officer.

Attendance at gun and rifle practice and musters.

In the event of an officer being unable to attend to these duties he can make arrangements with some other medical officer to take his place (informing the commanding officer), or report to the principal naval medical officer in sufficient time for him to provide for the duties.

Medical officers are liable to be detailed for duty on boards, etc.

BAND.

The band of the naval brigade, the total strength of which cannot exceed twenty, exclusive of the boys allowed, must be effective for service, well drilled, and liable to serve in the force on any emergency. Attendance at band practice counts as drills. Supernumeraries may be employed by the commanding officer, provided that no portion of the cost falls upon the brigade fund.

ACTUAL SERVICE.

In the event of the brigade being called out for actual service every member, not released by proper authority, is bound to serve in any vessel belonging to or employed by the Victorian government or on shore, under the penalty of being treated as a deserter.

FINES.

The commanding officer has the power to enforce fines, not exceeding the following amounts:

	s.	*d.*
For appearing at muster or drill improperly dressed or with clothing, arms, or accouterments dirty	2	6
Talking at muster or drills	2	6
Inattention and other minor irregularities	2	6
Neglecting to notify change of address within fourteen days of such change	2	6
Neglect of duty	5	0
Leaving the muster or drill without permission	7	6
Minor cases of insubordination	10	0
Being absent without leave within the meaning of the regulations	10	0
Drunkenness on duty, or in camp, or elsewhere in uniform	20	0
Failing to become effective	20	0
Being absent from the annual review or half-yearly official inspection	20	0

Any officer who does not attend more than three-fourths of the annual drills is not allowed to retain his commission or warrant unless it be represented by the commandant that there are special reasons for a relaxation of the regulation.

Any petty officer who does not attend more than three-fourths of the annual drills is disrated, unless it shall appear to the commandant that there are special reasons for the relaxation of the regulation.

Any member of the brigade failing to attend the required number of musters or drills in any month, unless on leave, is at the end of each month deemed to have been absent without leave within the meaning of the regulations.

Any member absent without leave for a period of two months is dismissed, unless in the opinion of the commandant there be extenuating circumstances.

Fines which cannot be settled from arrears of pay are recovered by the commanding officer in court.

SYSTEM OF PAY.

For the naval brigade at the commencement of each year the commanding officer is credited 30 shillings per head for the established *strength*, together with 20 shillings per head for each effective member.

This is expended on behalf of the force for clothing, not including pea-jackets; store-rooms; expenses in connection with musters, camps, and inspections; expenses incidental to target practice and prizes, not exceeding 15 per cent. of the effective money; band and cost of all supplies received from the ordnance department, or any other expenditure authorized by the Council of Defense. The accounts must be carefully kept and regularly rendered.

Every commissioned, warrant, or petty officer, or seaman of the brigade, regularly enlisted, receives an annual retainer, or allowance, according to the following scale, on condition of performing the necessary drills, afloat and on shore, as before mentioned:

Captain	£100	Midshipmen	£18
Commander	60	Warrant officers	25
Lieutenant-commanders and lieutenants	50	Chief petty officers	18
Sub-lieutenents	25	Engine-room artificers	10
Surgeons	36	First-class petty officers	16
Engineers	15	Second-class petty officers	14
		Able seamen	12

Pay of the instructors who are permanently attached to the brigade.

No.	Rank.	Minimum pay.	Maximum pay.	Increase per annum.
		£ s. d.	£ s. d.	£ s. d.
1	Gunner first class	182 10 0	225 0 0	5 0 0
1	Gunner second class	155 2 6	200 0 0	5 0 0

The annual retainer is paid in quarterly installments. A proportionate number of drills must be performed during each quarter; and any member failing to do so is not entitled to such quarter's allowance.

For the two extra days afloat, to complete the Easter cruise, able seamen receive 10 shillings per diem, and the other ranks in proportion, except engineers and engine-room artificers, who, whenever serving afloat for drill or on a cruise, receive, the former 25 shillings per diem, and the latter 20 shillings per diem.

When called out for actual service, or for drills other than those included in the regularly required duty, members of the brigade receive the following pay per diem:

	£	s.	d.
Captain	2	0	0
Commander	1	10	0
Lieutenant-commanders or lieutenants over eight years' seniority	1	5	0
Lieutenants	1	0	0
Sub-lieutenants	0	16	0
Gunners, first class	0	12	0
Gunners, second class	0	10	0
Midshipmen	0	10	0
Chief petty officers	0	9	0
First-class petty officers	0	8	6
Second-class petty officers	0	8	6
Able seamen	0	7	6

Engineers and engineer artificers, when called out for actual service, receive the same pay as those of similar rank in the permanent force.

Medical officers receive the following pay: For examination of recruits, 2*s.* 6*d.* a head; for other military duties, surgeons, £2 for whole day, £1 for half day; staff surgeons, £2 10*s.* for whole day, £1 5*s.* for half day.

The maximum amount of pay, however, derivable from the various sources cannot exceed in one year £36 for a surgeon, and £48 for a staff surgeon, unless there has been actual service.

CONCLUSION.

The reorganization of the military and naval forces was undertaken in 1884, after the passage of the discipline act now in force, and at present the available force is on the new basis.

Batteries for the defense of Melbourne were first constructed in 1861 at Williamstown, Sandridge, and Queenscliff. Those at Sandridge have since been set aside, and the first line of defense made at the Heads, the entrance to the bay. The principal works are batteries at Queenscliff, Swan Island, and Point Nepean. A fort is placed upon a shoal on the north side of the south channel, and for the further protection of this channel a fort has also been erected on Point Franklin.

During the last three years the artillery and torpedo defenses have been increased; the new forts are being armed with breech-loading guns, and all the muzzle-loading guns in the old forts are being replaced by modern guns.

Electric lights have been established all along the fortifications, and the mine fields fully repaired. All sites necessary for the defense of Melbourne against land attack have been reserved by the government.

During the last three years the expenditures on fortifications, guns, torpedoes, etc., have averaged $800,000 per annum.

MELBOURNE, *April* 15, 1889.

NOTE.—The organization of the military and naval forces of New South Wales, the other of the two most important of the Australasian colonies, is in a great many respects similar to that of Victoria.

The military force consists of regulars, volunteers under the partial-payment system, and a reserve of volunteer rifle clubs. The strength of each, including all ranks, is as follows:

Regulars:		Volunteers—Continued.	
General staff	22	Infantry	2,900
ermanent artillery	498	Medical staff	5
Permanent submarine miners.	24	Honorary chaplains	4
Permanent mounted infantry.	32	Reserves:	
Volunteers:		Cavalry	400
Permanent staff	61	Artillery	110
Artillery	514	Infantry	1,500
Engineers	97	Medical staff	6
Submarine miners	111		
Mounted infantry	300	Total	6,584

The annual training of the partially paid force consists of nine days consecutively in camp, and three detached days for the whole force. Besides this, sixteen half days for artillery, twelve half days and ten night drills for engineers, twenty-two half days for submarine miners, and thirteen half days for infantry.

The reserve corps must attend twelve daylight and twenty night drills. An allowance of £2 per annum is made to each effective member of this corps, for uniform.

There is no permanent naval force in New South Wales, but a naval brigade and naval artillery volunteers.

The brigade consists of three hundred and twenty-eight officers and men, and is chiefly composed of men-of-war's men whose time has expired. It is divided into six companies, one of which is stationed at Newcastle and the other five at Sydney.

The commissioned officers and midshipmen receive pay only when doing duty, actual or on drill, and the others as follows: Warrant officers, £18; petty officers, £14; and seamen, £12 per annum.

The naval artillery volunteers consist of two hundred and twelve officers and men, and are organized on the same principle as those in Great Britain. Neither the officers nor men receive any pay, but an annual appropriation of £700 is made by the government for working expenses.

The *Wolverene* is the only man-of-war. She is a wooden steamer armed with seventeen 64-pounder rifles, three howitzers, and one Gatling gun. Only a small force is kept on board to keep the ship in order, but the brigade take short trips to sea in her occasionally for the purpose of drill, and the volunteers also go on board at times for that purpose.

In addition to the *Wolverene* there are a barge, the *Neptune*, fitted with a 64-pounder muzzle-loading rifle, and two torpedo-boats, the *Acheron* and *Avernus*.

APPENDIX.

A.

LIST OF THE VICTORIAN EXECUTIVE COMMISSIONERS.

PRESIDENT.

The Hon. Sir James MacBain, K. B., President of the Legislative Council.

EXECUTIVE VICE-PRESIDENT AND TREASURER.

The Hon. Lieut. Col. Frederick Thomas Sargood, C. M. G., M. L. C..

VICE-PRESIDENTS.

The Hon. M. H. Davies, M. L. A., Speaker of the Legislative Assembly
The Hon. Sir William John Clarke, Baronet, M. L. C.
The Hon. Peter Lalor, M. L. A.

MEMBERS.

The Hon. James Munro, M. L. A.
The Hon. William Mountford Kinsey Vale.
Joseph Bosisto, Esq., C. M. G., M. L. A.
Robert Murray Smith, Esq., C. M. G.
The Right Worshipful the Mayor of Melbourne, William Cain, Esq., J. P.
Thomas Houlden Thompson, Esq., J. P., Mayor of the city of Ballarat.
Patrick Hayes, Esq., J. P., Mayor of the city of Sandhurst.
Lambton L. Mount, Esq., President of the Victorian Chamber of Manufactures.
William Arthur Trenwith, Esq., President of the Melbourne Trades Hall Council.
John Blyth, Esq., J. P.
Henry Byron Moore, Esq.

SECRETARY.
George T. A. Lavater, Esq.

B.

OFFICIAL REPORTS OF THE VICTORIAN EXECUTIVE COMMISSIONERS.

FIRST REPORT.

The Executive Commissioners beg to report that on the 5th of April last competitive designs for the temporary annexes required in connection with the Melbourne International Exhibition of 1888 were called for by advertisement in the Melbourne daily papers, the designs to be sent in by 4.30 p. m. on Monday, 16th instant.

The ground proposed to be covered was 15 acres, and the conditions limited the price per acre to £4,500.

In response to this advertisement thirty competitors prepared and forwarded thirty-three different designs, varying in estimated cost per acre from £3,450 to £4,500.

The examination of these designs was referred to the building committee, who, after spending a large amount of care and attention upon them, duly reported the result of their labors to the Executive.

After fully considering this report the Executive Commissioners now recommend that the design bearing the motto "Paxton" be placed first, and that bearing the motto "Guaranteed" second.

At the same time they desire to place on record their high appreciation of the care and ability displayed by nearly all the competitors, most of the designs sent in being of great merit.

GEORGE HIGINBOTHAM,
President.

MAY 27, 1887.

SECOND REPORT.

Since the meeting of the full Commission on May 27, last, the Executive Commissioners have held five meetings, and have dealt with the following subjects, viz:

(1) In accordance with the verbal statement made at the last meeting, a circular was issued to all the lately-appointed Commissioners, accompanied by a list of the committees already formed, requesting them to state upon which of these they would prefer to act. In response to the foregoing, one hundred and seventy-six answers have been received,

out of which one hundred and fifty-eight specified the committees upon which the writers desire to act; eight stated they were willing to act if their services were required, and ten declined. Of the remaining one hundred and three Commissioners, sixteen compose the Executive, nineteen the London Committee, five are out of the colony, two are deceased, and sixty-one have not replied. The Executive Commissioners submit herewith for confirmation a printed list of these committees, compiled in accordance with the communications received.

(2) In relation to the liability in connection with the acceptance of the designs for the temporary annexes, the Executive Commissioners desire to report that on the 18th ultimo a letter was addressed to the successful architect, Mr. G. R. Johnson, as follows:

MELBOURNE, *June* 18, 1887.

SIR: Referring to the competitive designs for temporary annexes which have been furnished on the invitation of the Executive Commissioners, I have the honor to inform you that your design has been placed first.

With regard to the preparation of the specifications and drawings in connection with your design, I am directed to inform you that the Executive Commissioners desire that you will not proceed with these, except on the distinct understanding that you will not be entitled to any remuneration whatever beyond the prize of £250 in the event of the buildings designed by you not being, from any cause, carried out.

Before any instructions are given to you on the subject you will be required to give a written undertaking to the above effect to the Executive Commissioners.

I have the honor to be, sir, your most obedient servant,

J. E. SHERRARD,
Assistant Secretary.

G. R. JOHNSON, Esq.,
83 *Little Collins Street, City.*

On the 23d June Mr. Johnson replied to the following effect:

83 LITTLE COLLINS STREET EAST,
Melbourne, June 22, 1887.

SIR: I have the honor to acknowledge receipt of yours dated 18th instant, and in reply thereto beg to state my willingness to comply with the conditions named therein.

I have the honor to be, sir, faithfully yours,

GEO. R. JOHNSON.

J. E. SHERRARD, Esq.,
Assistant Secretary, Centennial International Exhibition, Melbourne.

(3) After carefully considering the requirements for the financial year ending 30th of June, 1888, the Executive Commissioners estimated the amount necessary to be voted by Parliament at £125,175, and on the 27th of May this estimate was forwarded to the government, with an intimation that the Executive Commissioners anticipated being able to repay a considerable amount during the following financial year. The Executive Commissioners have been informed that the treasurer will take an early opportunity of submitting this matter for the approval of Parliament.

(4) Rules and regulations for the conduct of the proceedings of the

Commissioners, the duties of officers and employés, etc., have been drawn up, and are now submitted for confirmation.

Conditions under which tenders will be invited for the printing of the Official Catalogue have been drawn up, and will be advertised forthwith.

Communications have been received from the London Committee, through Mr. J. Cashel Hoey, their secretary, to May 27, intimating that Her Majesty's consent to the appointment of an Imperial Commission in connection with the Centennial International Exhibition, Melbourne, had been obtained by Sir Henry Holland, the Secretary of State for the colonies, and that the necessary steps were being taken to appoint the Commission. His Royal Highness the Prince of Wales has consented to be President, while the Earl of Rosebery will be Executive President. The London Chamber of Commerce and the Council of the Associated Chambers of Commerce have promised to heartily support the Exhibition, and are taking active measures to that effect.

As there appeared to have been some delay in communicating with Foreign Governments, a cablegram was dispatched to the Agent-General, requesting him to urge upon the Minister for Foreign Affairs the great importance of immediate communications being addressed to Foreign Governments, asking their co-operation, and also to represent to the Imperial Government the pressing necessity for the immediate appointment of the Imperial Commission.

Under these circumstances the Executive Commissioners have extended the date for receiving applications for space from the 31st of August to the 31st of October, 1887.

Opportunity has been taken of the presence of the Imperial Chinese Commissioners to enlist their sympathies and influence on behalf of the formation of a Chinese Court at the forthcoming Exhibition, and there is every reason to believe that the favorable representations which they have made to their Government will be attended with success.

Last month the President and Secretary visited Adelaide, and were present at the opening of the Adelaide Jubilee Exhibition, as the representatives of the Commissioners of the Centennial International Exhibition, the latter also for the purpose of inspecting the arrangements and influencing exhibitors or their representatives with respect to exhibiting in Melbourne next year. About fifty members of this Commission have also visited Adelaide since the opening of the Exhibition.

The President desires to take this opportunity of testifying to the courtesy and kind attention he received during his visit as the representative of the Commissioners, which was equally extended to the Secretary.

JULY 14, 1887.

THIRD REPORT.

The Executive Commissioners, since the last general meeting held at these offices on the 14th of July, have held ten meetings, and now report as follows:

At the last general meeting it was found, in consequence of the manner in which the "Victorian Exhibitions Act" was framed, that it was impossible to adopt that portion of the report then submitted, referring to the rules and regulations.

Since that date, however, an act to make better provision for the holding of the Public International Exhibition in Melbourne in 1888 has been passed through both Houses of Parliament, and on the 12th of the present month received the assent of the Governor.

By this act the quorum of the Commissioners for the transaction of business is fixed at fifteen, and consequently the Executive are now enabled to submit for approval a draft copy of the proposed rules and regulations for the conduct of business, etc.

The promised Royal Commission in London has been appointed, His Royal Highness the Prince of Wales consenting to accept the position of President, with Lord Rosebery as Executive President. The list of the Commission contains the names of some of the leading and most influential personages in the United Kingdom.

The first formal meeting was held at Marlborough House on the 13th of August, 1887, His Royal Highness the Prince of Wales presiding. To meet the expenses of this Commission, the British Parliament has voted the amount of £5,000.

The London Committee of the Victorian Commissioners have engaged the services of Sir Vincent K. Barrington to visit the different Continental Governments and press upon them the desirability of their being officially represented at the Exhibition. So far as can be judged by the advices received from their secretary, Mr. J. Cashel-Hoey, there is every reason to be satisfied with the choice they have made, and to believe that Sir Vincent Barrington's mission will be successful.

As regards the representation of the Australasian Colonies at the Exhibition, New South Wales is the only one at present that has appointed a Commission. South Australia and Tasmania have both promised to appoint one as soon as Parliament has voted the money.

The Premier of New Zealand has expressed the hope that the next Parliament will authorize the Government to take steps to provide for the proper representation of that colony.

Our own Government is at present in communication with Queensland on the same subject, and Western Australia has declined. Pressure has been brought to bear through the proper channels on the Indian Government to induce an official representation of that important dependency of the Empire.

His Excellency the Governor, at the request of the Premier, has signified his willingness to become a patron of the Exhibition, and at his request the Governors of all the other Australasian Colonies have also consented to act in the same capacity.

Advices have been received stating that the United States Government has promised to bring before Congress, as soon as that body has assembled for the dispatch of business, the question of the official representation of the Republic at our Exhibition.

The printing of the Official Catalogue was let by tender to Messrs. Mason, Firth & McCutcheon on the 30th of August last, that firm agreeing to pay to the Commissioners the sum of £605 for the privilege, and also to furnish 25,000 copies of the Catalogue, in two volumes, free of charge.

At the last general meeting the choice of the Executive in the matter of the designs for temporary annexes was approved, and since that date the sum of £100,000 has been placed by the treasurer on the estimates for the purposes of the Exhibition.

Tenders for the erection of the annexes on the plan of the approved designs were called for on the 17th of August, returnable on Friday, the 2d of the present month. Eleven tenders were received, and the lowest was found to be that of Mr. James Moore, the amount of his tender being £58,841 17*s.* 9*d.*

The amount of the estimate sent in with the approved design was £56,925; and, in view of the alterations made in some of the details of the design by the Building Committee, and the increased cost of timber consequent upon the late alterations in the tariff, the amount by which the tender was in excess of the architect's estimate was not considered excessive, and Mr. Moore's tender was accepted.

The contract was executed by the contractor on the following day (Saturday, 3d instant), and the Executive Commissioners trust that the work will be duly completed by the time specified in the contract conditions, namely, April 30, 1888.

The question of the water supply has been under consideration, and in order to reduce as far as possible the chances of damage by fire, etc., the Superintendent of the Fire Insurance Companies' Brigade (Captain Stein) has been consulted, and the Executive have every reason to believe that the arrangements in this matter will be as perfect as it is possible to make them, and that the insurance companies will be fully satisfied with the steps taken to guard against accidents in this respect.

The undermentioned committees have, since the last report, held the number of meetings respectively opposite their names, and are all making satisfactory progress in forwarding the interests of the Exhibition in their respective departments:

Finance Committee	6
Building and Gardens Committee	11
Building and Gardens Sub-Committee	2
Animal Products Committee	2

Vegetable Products Committee	3
Vegetable Products Sub-Committee	3
Minerals and Mining Committee	2
Advertising and Printing Committee	2
Wine Committee	1
Wine Sub-Committee	3
Manufactures Committee	10
Manufactures Sub-Committee	3
Fine Arts Committee	1
Fine Arts Sub-Committee	1
Districts of Victoria Committee	1

As evidencing the interest shown by Victorian manufacturers in the forthcoming Exhibition, the Manufactures Committee have already received applications for about 120,000 feet of space.

The following gentlemen have signified their desire to act on the different committees as follows: Capt. F. C. Rowan, Manufactures; W. K. Thomson, Esq., Machinery; Jenkins Collier, Esq., Fine Arts; E. H. Cameron, Esq., Vegetable Products; W. Drummond, Esq., Districts of Victoria; Hon. R. Burrowes, Minerals and Mining.

The Executive regret to report that Mr. Joseph Bosisto, C.M.G., has found it necessary to resign his position as chairman of the Vegetable Products Committee. The Hon. W. M. K. Vale, Treasurer to the Commissioners, has been appointed to take his place.

Signed on behalf of the Executive Commissioners.

GEO. H. HIGINBOTHAM,
President.

SEPTEMBER 20, 1887.

FOURTH REPORT.

In presenting their fourth report the Executive Commissioners desire to express their regret at the delay which has taken place in calling the meeting of the full Commission to receive it.

From various causes the rules and regulations for the conduct of business were not gazetted until the 8th of the present month, and it was not considered advisable to put the Commissioners to the trouble and inconvenience of attending any meetings until all proceedings had been divested of any doubt as to their legality by the formal approval and gazettal of the rules and regulations above mentioned, as required by the fourth section of the "Victorian Exhibitions Act," No. 619.

Since the last general meeting, held at the offices on the 21st of September last, the business in connection with the forthcoming Exhibition has been making steady and satisfactory progress.

The committees appointed to deal with the various matters entrusted

to them have held meetings for the transaction of business as follows:

Executive (including four subcommittee meetings)	9
Building and Gardens (including twelve meetings of subcommittees)	18
Animal Products	4
Vegetable Products	2
Wine	3
Districts of Victoria	1
Districts of Victoria (joint visiting committee)	2
Manufactures	1
Machinery	1

Reports received from London as to the progress of Exhibition matters in Great Britain and Ireland, and on the Continent of Europe, may be considered as satisfactory.

In addition to the British Commission, which had already been appointed at the date of the last general meeting, the Governments of Germany, Belgium, and Spain have appointed Commissions and granted subsidies to cover the necessary expenditure in connection with the same.

The Agent-General reports that good progress has been made in Italy, and that while that country declines to appoint a Commission, the Government has determined to grant the same facilities for the Melbourne Centennial International Exhibition of 1888 as it is intended to grant for the Paris International Exhibition of 1889.

Although the Republic of France has hitherto declined to be officially represented, it would appear that Sir Graham Berry has still some hopes of the rescinding of that decision before the time of applying for space finally closes.

The Austro-Hungarian Empire, if not represented directly by a Government Commission, will in any case have the assistance of the Vienna Export Verein acting under the authority of and with the support of the Imperial Government.

The Government of the United States is unable to deal with the matter of a subsidy until the meeting of Congress, which takes place during the first week in December next. From communications received, however, it would appear that this Government is desirous of being represented, and that the President would most probably appoint a Commission at once, as he has the power to do, but that he prefers to await the voting of the necessary funds by Congress.

Of the Australasian Colonies, that of New South Wales is the only one that has yet appointed a Commission, but a communication lately received from the Chief Secretary of South Australia states that one is to be appointed shortly in that colony.

The course that Queensland will ultimately adopt is not yet known, and it is understood that at present the matter still forms the subject of communication between the Government of that colony and our own.

The late political changes that have taken place in New Zealand

have greatly tended to retard the advancement of the question of a Commission to represent that colony, but all possible steps have been taken by the Executive Commissioners to bring the subject of the Exhibition before the notice of probable and possible exhibitors, and they still entertain hopes that the New Zealand Government will see fit to be officially represented.

It is with considerable regret that the Executive Commissioners have to state that a cablegram has been received from the Premier of Tasmania, under date of November 3, as follows:

Owing to the impossibility of securing adequate representation of Tasmania at the Melbourne Exhibition in the brief time now available, the Government were last night reluctantly compelled to withdraw the vote they proposed for this purpose. They have not been in a position to bring the matter before Parliament at an earlier time.

This is the more to be regretted, as, from the first inception of the Exhibition, the Tasmanian Government had expressed the intention of supporting the appointment of a Commission for that colony, together with a vote of money to defray necessary expenses. Our Government has been requested to again urge the Government of Tasmania to reconsider its determination.

The erection of the temporary annexes, of which mention was made in the last report, has been steadily proceeded with by the contractor, Mr. James Moore, under the supervision of the architect, Mr. George R. Johnson, whose statement on the progress of the work will be found herewith.

Shortly after the appointment of the Executive Commissioners on the 6th of January last, the trustees handed over to them the buildings and grounds then in their possession. These included the aquarium and fernery. In the former a large fish tank of iron and glass, 60 feet long and 12 feet wide, was then in course of erection, and the Executive Commissioners, following out the design which the trustees had in view, have completed the tank and the imitation stalactite cave, and opened the same to the public. Considerable additions of ferns from New South Wales, as well as from this colony, have been added to the fernery, and by the time the Exhibition is opened it is anticipated that these will prove extremely attractive.

Special allusion to the water supply was made in the last report, and since then the whole of the water mains, with the necessary fire-plugs, valves, etc., have been placed in position, and acting on the recommendation of the Building Committee, who were assisted by the advice of Superintendent Stein of the Fire Insurance Companies' Brigade, the captain of the Exhibition fire brigade has been appointed, and it is intended to form under his direction a competent and efficient fire brigade, partly from men to be specially engaged for that work, and partly from other employés of the Commissioners.

In order to secure a supply of water at all times in case of accident

to one of the mains, the pipes will be connected not only with that in Nicholson street, but also with the Rathdown street main.

With a view to insure sufficient pressure whenever required, it is intended to erect, in a suitable position near the site of the aquarium, a 16 horse-power "Otto" gas-engine, with a force-pump attached, which will be capable of forcing the water into the pipes with which the building is reticulated at a pressure equal to 300 pounds to the square inch.

The Executive Commissioners would take this opportunity of expressing their indebtedness for the cordial assistance and co-operation they have received in the matter from the Minister for Public Works, the Hon. John Nimmo, and the Engineer of the Water-Supply Department, Mr. William Davidson. They also desire to place on record their thanks to Superintendent Stein for his valuable advice and assistance.

The question of electric lighting is receiving the attentive consideration of a subcommittee specially appointed from the Building Committee for that purpose, and they expect shortly to submit a scheme by which such electric lighting as may be required can be carried out.

Arrangements have been made with the Metropolitan Gas Company for the laying of the necessary gas mains to properly and efficiently light the temporary annexes, and this work is now being proceeded with.

The external and internal decoration of the permanent buildings, as well as of the temporary annexes now being erected, is also under consideration. Whilst desirous of making the decorations as effective as possible, the Executive Commissioners do not lose sight of the fact (especially in view of the temporary character of the new annexes) that due economy in this matter must be observed.

The decoration of the grounds by means of flower gardens, lawns, etc., has been entrusted to a subcommittee of the Buildings and Gardens Committee, with Mr. Joseph Harris, M. L. A., as chairman. The name of that gentleman is sufficient guarantee that this portion of the work of decoration will not be neglected, and that during the currency of the Exhibition the appearance of the gardens will leave little (if anything) to be desired. To this end the Executive Commissioners, acting on the advice of the Garden subcommittee, and in view of the fact that it was necessary to remove the small nursery and propagating-house erected by the trustees, have had built a new propagating-house, with suitable shelter-sheds, frames, etc., on the Nicholson street side of the eastern machinery annex. This will enable the head gardener to keep up a full supply of bedding and other plants for the maintenance of the gardens.

In deference to the desire expressed by the British and certain Continental Governments, as well as some of the Australasian Colonies, the Executive Commissioners deemed it expedient to postpone the date for receiving applications for space to the last day of the present year. This decision was arrived at on the 10th of last month, and was immediately made known in every possible manner to all parts of the world.

The forms and circulars drawn up by the various committees in connection with the exhibition and sale of wines and other liquors, vegetable and animal products, minerals, and mining, etc., have been issued to all intending or probable exhibitors. They have also been forwarded to the various associations, shires, councils, agricultural and horticultural societies, etc., and wherever it was considered that the information therein contained would in any way assist in furthering the interests of the Exhibition.

A bill to authorize the sale of fermented and spirituous liquors, etc., has been drafted and forwarded to the Chief Secretary, and will doubtless receive the early attention of Parliament.

A joint subcommittee, consisting of the chairmen of the various committees, has been formed under the chairmanship of Mr. P. Hayes (chairman of the Districts of Victoria Committee). This subcommittee visited Sandhurst on the 12th October and Geelong on the 20th of the same month, these being the days upon which the agricultural societies held their annual shows at the places mentioned.

The subcommittee was accompanied on each occasion by the members of both Houses for the districts visited, and the objects and scope of the Exhibition were brought prominently before the leading manufacturers, agriculturists, etc., resident in those localities. Encouraging promises of support were obtained, and the subcommittee has every reason to be satisfied with the result of its labors. It is the intention of this subcommittee to visit Ballarat on the 24th of this month, the opening day of the Agricultural Show at that place, where it trusts to be equally successful.

Until advices are received from the Agent-General, it will be premature to speculate as to the number of exhibitors or the amount of space likely to be required by the British and other Governments or exhibitors; but so far as Victoria is concerned, it may be stated that up to the present time about 725 applications for space have been received from manufacturers and producers, which will cover, without allowing for the necessary passage-ways, an estimated area of say 160,000 square feet.

It has been submitted to the Executive that it is desirable to add to the Buildings and Gardens Committee the names of Messrs. Jenkin Collier and Clement Hodgkinson, as possessing special qualifications. These gentlemen have been communicated with, and have signified their willingness to act if appointed. The Executive, therefore, request the authority of the Commissioners to add their names to the Buildings and Gardens Committee.

After full consideration, the Executive Commissioners have concluded that the time has now arrived when it has become necessary to appoint committees to deal with the questions of ceremonials and refreshments, and the following names are submitted for the approval of the Commissioners:

CEREMONIAL COMMITTEE.

The Hon. Col. F. T. Sargood, C. M. G., M. L. C., chairman.

George L. Allan, Esq.
The Hon. J. Balfour, M. L. C.
The Right Worshipful the Mayor of Melbourne, B. Benjamin, Esq., J. P.
The Hon. T. Bent, M. L. A.
J. Blyth, Esq., J. P.
A. C. Brownless, Esq., M. D., the Chancellor of the University of Melbourne.
W. Cain, Esq., J. P.
The Hon. M. H. Davies, Speaker of the Legislative Assembly.
The Hon. J. Gavan Duffy, M. L. A.
R. L. J. Ellery, Esq., F. R. S., Government Astronomer.
The Hon. N. Fitzgerald, M. L. C.
F. S. Grimwade, Esq.
The Hon. J. Munro, M. L. A.
Sir A. Nicolson, Bart.
C. M. Officer, Esq., M. L. A.
The Hon. F. Ormond, M. L. C.
The Hon. J. B. Patterson, M. L. A.
John Quick, Esq., LL. D., M. L. A.
The Hon. Col. W. C. Smith, M. L. A.
R. Murray Smith, Esq., C. M. G.
W. A. Trenwith, Esq.
E. L. Zox, Esq., M. L. A.

REFRESHMENTS COMMITTEE.

H. Byron Moore, Esq., chairman.

C. R. Blackett, Esq., F. R. S.
J. Blyth, Esq., J. P.
The Hon. J. H. Connor, M. L. C.
G. R. Fincham, Esq.
P. Hayes, Esq., J. P.
W. B. Jones, Esq., J. P.
L. L. Mount, Esq.
The Hon. J. Munro, M. L. A.
Sir A. Nicolson, Bart.
Thomas O'Grady, Esq., J. P.
C. Pinschof, Esq., Consul for Austro-Hungary.
The Hon. L. L. Smith, M. L. A.
G. J. Sims, Esq.
T. H. Thompson, Esq., J. P.
W. K. Thomson, Esq., J. P.

Signed on behalf of the Executive Commissioners.

GEO. HIGINBOTHAM,
President.

NOVEMBER 14, 1887.

NOTE.—At the meeting of the Exhibition Commissioners held at the offices, Exhibition Buildings, on Thursday, November 17, 1887, the foregoing report was adopted with the addition of the following names to the undermentioned committees:

Finance Committee.—C. Pinschof, Consul for Austro-Hungary.

Manufacturers' Committee.—C. Pinschof, Consul for Austro-Hungary.

Machinery Committee.—C. Pinschof, Consul for Austro-Hungary.

Ceremonial Committee.—The Hon. W. E. Hearn, LL. D., M. L. C.; A. Marks, Esq., Consul for Japan; Frederick McCoy, Esq., C. M. G., Sc.D. (Cantab.), and G. J. Sims, Esq.

Refreshments Committee.—James Fergusson, Esq., J. P.

GEO. HIGINBOTHAM,
President.

NOVEMBER 17, 1887.

ARCHITECT'S REPORT.

83 LITTLE COLLINS STREET EAST,
Melbourne, November 14, 1887.

GENTLEMEN: I have the honor to report for your information that the contractor for the annexes is pushing on the works with dispatch.

The roof-timbers are on about 4 acres of the building, the gutters are being laid, and I expect to commence putting on the galvanized iron in the course of a few days; so that this portion will be completed by Christmas.

There are at the present time two hundred workmen engaged on the works, and the contractor will give employment to another one hundred men so soon as two cargoes of timber, now unloading for this building, are delivered on the site.

I have the honor to be, gentlemen, faithfully yours,

GEO. R. JOHNSON.

The EXECUTIVE COMMISSIONERS
Centennial International Exhibition, Melbourne, 1888.

FIFTH REPORT.

The Executive Commissioners have considered it desirable to call the Commissioners together earlier than usual this month, in view of the near approach of the Christmas holidays, which might interfere with the attendance.

It was stated in the last report that Exhibition matters in Great Britain and Ireland, and throughout Europe, were making satisfactory progress. Further advices received from the Agent-General in London, Sir Graham Berry, confirm this view, and also tend to encourage the hope that the French Government will yet see fit to be officially represented at the Exhibition.

Following upon the discussion which took place at the last meeting on the official representation of the United States of America, and in view of the unavoidable delay which had necessarily taken place in the meeting of Congress, the Consul-General, Col. James M. Morgan, has applied provisionally for 100,000 square feet of floor-space in the interests of the American exhibitors.

A telegraphic communication has been received from Germany, asking that their Commission might be assured of an amount of space and a position at least equal to what they were allotted at the Exhibition of 1880. The Executive Commissioners have replied in effect that this will be granted.

An official communication has been received from the Premier of Queensland, stating that his Government proposes to ask Parliament to vote a sum of money for the purpose of securing the adequate representation of that colony at the Exhibition.

No further communication has been received on the subject of the representation of New Zealand, but it is confidently expected that a New Zealand Commission will be appointed.

The South Australian Commission has now been appointed, with his excellency Sir William C. F. Robinson, G. C. M. G., Governor of South Australia, as President. The Commission contains the names of many of the leading gentlemen in the sister colony.

As stated in the last report, a letter was written to the Premier of Tasmania, requesting him to again urge his Government to reconsider its decision not to be officially represented at the Exhibition. The Executive Commissioners regret that they have to report that a communication has since been received from the Premier of Tasmania, stating that he had resubmitted the question to his Cabinet, and that it was not deemed advisable to again ask Parliament for the necessary vote.

Opportunity was taken of the presence in Adelaide of Mr. W. A. Trenwith, one of the Executive Commissioners, to secure the representation of the Commissioners for the Centennial International Exhibition, Melbourne, at the ceremony of the declaration of awards at the Adelaide Jubilee Exhibition, which took place on the 30th ultimo.

A letter has been addressed to the Premier asking him to urge upon the several Government Departments of Victoria the necessity of applying for space before the 31st of December. At the present time the only Department which has applied for space is that of Mines and Water Supply.

Since the last meeting of the Commissioners, the Districts of Victoria Joint Visiting Committee met at Ballarat, and received gratifying assurances of support from the leading manufacturers and producers in the district.

The Wine Committee have visited Lilydale, Sunbury, Rutherglen, Barnawatha, and Wahgunyah, and have canvassed the surrounding districts with encouraging results. They will also endeavor to visit Sandhurst, Echuca, Tabilk, Dunolly, Ararat, Great Western, and other wine-growing districts.

The committees appointed to deal with the various matters entrusted to them have held meetings for the transaction of business as follows:

Executive (including one meeting Correspondence Committee)	4
Ceremonial	2
Finance	2
Wine (including visiting subcommittees)	4
Districts of Victoria Joint Visiting Committees	1
Building (including four subcommittees)	5

The Ceremonial Committee, which was formed at the last meeting of the Commissioners, has held two meetings, and has submitted to the Executive the following report on the question of the musical arrangements in connection with the Exhibition. As the report, if adopted, will

necessitate the expenditure of a considerable sum in carrying out the recommendations therein contained, the Executive Commissioners, while thoroughly approving of the scheme, have deemed it advisable to submit it to the full Commission for their consideration and decision.

(1) With a view to the satisfactory carrying out of the Exhibition, it is considered necessary that arrangements be made for the formation of an orchestra of about sixty performers.

(2) In order that the orchestra may be complete in all its parts and highly trained, the following arrangements are deemed to be absolutely necessary:

(*a*) That an engagement be made for (say) twelve months with one of the leading orchestral conductors in Europe to come out as director and conductor of the Exhibition orchestra.

(*b*) That from ten to fifteen performers on special instruments (required in addition to those obtainable in the colony to form a complete orchestra) be engaged in Europe.

(*c*) That local instrumentalists be engaged to complete the number required to form the orchestra.

(*d*) That the director and performers engaged be solely for the services of the Exhibition Commissioners during the term of their engagement.

The Executive recommend that the name of Major Ellery be added to the Building Committee.

The Executive have been informed that the Building Committee have given great consideration as to the method in which it is proposed to light the building, and at the present they have arrived at the conclusion that if the cost is justifiable it is desirable to use the electric light. With this view the Executive Commissioners desire your authority to take the necessary steps with the concurrence of the Government.

GEO. HIGINBOTHAM,
President.

SIXTH REPORT.

In presenting this report, the Executive have pleasure in being able to state that, so far as regards the quantity of exhibits for which they have received space applications, the success of the Exhibition is assured. The floor-space applied for already exceeds that at the disposal of the Commissioners, and so soon as the actual total amount asked for is known the question of further accommodations (should it arise) will have to be promptly considered and dealt with.

The applications, so far as can be ascertained from the information to hand, amount to about 1,150,000 square feet, and there yet remain in addition Belgium, Spain, Canada, Switzerland, Fiji, and many other countries which will require space in greater or lesser quantity.

The total amount which will probably be asked for will not be less than about 1,250,000 square feet, irrespective of wall-space.

The question of lighting the building by gas or the electric light has, after very careful consideration by the Building Committee, been decided by the Executive in favor of the latter.

With the assistance of Mr. K. L. Murray, the electrical engineer to the railway department, specifications and conditions of contract for lighting the whole of the building by electricity were prepared, and tenders called for by advertisement on the 5th instant, returnable at the office of the Commissioners on the 21st of next month.

To the subject of the insurance on some of the pictures proposed to be sent out for exhibition, the Executive Commissioners devoted much time and careful consideration. It was pointed out by the Royal Commission that, if such insurance (amounting to £5,000) were guaranteed by the Victorian Commissioners, they would be placed in a position to make a special effort to gather together a loan collection of pictures of the highest class, and valued at £250,000.

Keeping in view the great attraction such an exhibit would doubtless be, its educational tendency, and the fact that to many thousands of Australians it might prove the only opportunity they would ever have of seeing such a collection of pictures, the Executive Commissioners agreed to vote the amount required, coupled with the condition that they would not be liable for any further expenditure in connection with this exhibit.

The collecting of these pictures has been placed in the very capable hands of Sir Frederick Leighton and Mr. William Agnew, and the Executive trust that the result will prove as satisfactory as can be desired.

The prevention of fire, and its extinction, should the necessity arise at any time during the progress of the Exhibition, is being steadily kept in view. A fire brigade has been formed consisting at present of a superintendent and five firemen, and this number will be added to from time to time as the works progress.

A certain number of the employés will also be utilized as auxiliary firemen, and will reside on the premises in readiness to act if required.

A fire station has been built in the eastern annex, and the brigade will in future be located there.

The inconvenience of the position of the present offices, as well as the want of proper accommodation for the staff employed therein, forced itself upon the attention of the Executive at a very early stage of their entering upon their duties. It has been determined to have the offices removed to the southern end of the eastern annex, near the Nicholson street entrance, and the work of erecting the new offices has been let by contract and is now being rapidly proceeded with.

The permanent buildings, both on the outside and inside, have been carefully examined, and it has been deemed advisable to have the former thoroughly cleaned and painted, and the latter dealt with in the same manner and redecorated. Tenders have been invited for competitive designs for the internal decoration of the main hall at a cost not to exceed £3,500. A contract for painting the outside has been entered into with Mr. G. C. Williams for the sum of £1,883 10*s*.

The Building Committee, after duly considering the effect on the ap-

pearance of the annexes of the galleries proposed to be erected on each side of the central avenue, have recommended to the Executive that they be not proceeded with. As such an omission would, however, alter to some extent the original design which was submitted to and approved by the Commissioners, the Executive have considered it advisable that their consent should be asked to their non-erection. This will result in a saving on the contract of £1,262.

The various committees have held meetings since the last report as follows:

Executive (including five meetings Correspondence Committee)	11
Building (including thirteen meetings of subcommittees)	21
Finance	4
Wine	3
Ceremonial (including one meeting of subcommittee)	3
Fine Arts	2
Vegetable Products	1
Districts of Victoria	1
Machinery	1
Refreshments	1
Printing	1

In order that proper supervision may be insured over the erection and working of all machinery, whether shown as an exhibit or in use under the control of the Executive Commissioners, the Machinery, Building, and Mining Committees united in the recommendation that an efficient practical engineer should be appointed for the purpose. Applications were duly invited by advertisement in the Melbourne daily papers, with the result that the appointment has been offered to and accepted by Mr. Rees Davies, a gentleman of large experience, and under whose control the machinery department was placed at the last Exhibition.

The question of the formation of the Exhibition orchestra is still engaging the attention of the Ceremonial Committee.

Communications have been received from Mr. John Danks and from Dr. Brownless, asking to be placed on the Building and Fine Art Committees respectively, and their requests are referred to this meeting by the Executive.

The architect's report on the progress of the buildings will be found at the end of this report.

Signed on behalf of the Executive Commissioners.

GEO. HIGINBOTHAM,
President.

JANUARY 28, 1888.

83 LITTLE COLLINS STREET EAST, *January* 20, 1888.

GENTLEMEN: I have the honor to inform you that the works in connection with temporary annexes are progressing satisfactorily. The completion of the first section has been somewhat delayed, owing to wet weather, and the construction of the large salt-water storage tank under floor of same. All that remains to be done is the glazing, and this will be completed in five or six days.

The amount of work performed to date represents £31,300, and for materials and fittings on the ground (but not fitted), £6,200; making a total of £37,500.

There are three hundred and seventy men employed on the works, and the contractor is making arrangements for them to work two hours per day overtime, so that I expect to have the buildings completed well within the contract time.

I have the honor to be, gentlemen, faithfully yours,

GEO. R. JOHNSON.

To the EXECUTIVE COMMISSIONERS,
Centennial International Exhibition, Melbourne, 1888.

SEVENTH REPORT.

Since the meeting held at these offices on the 28th of January last there has been a very considerable advance made in the preparations for the forthcoming Exhibition.

The buildings forming the temporary annexes are rapidly approaching completion, and there is every prospect of the contractor completing them within the specified time.

The amount of space applied for by the different countries proposing to exhibit has, however, been so much in excess of what was originally estimated that the Executive Commissioners have found it necessary to authorize the construction of another bay at the northern end of the present structure, and giving an increased area of 50,250 square feet, for industrial exhibits.

The present machinery annexes are also much too small to hold the exhibits for which space applications have been received, and the matter of increasing the accommodation in this respect is now receiving the earnest attention of the Executive.

The painting of the external portion of the permanent buildings is progressing rapidly.

Messrs. Beeler & Davies, the contractors for the internal painting and decoration of the main hall and dome, are pushing forward the work with commendable energy. The cost of this work will be £3,500.

The same firm were also the lowest tenderers for the internal decoration of the annexes, both permanent and temporary, at a cost of £6,323 10*s.*, and their tender has been accepted, and this work is in active progress.

Referring to the compilation of the Official Catalogue and the literary work connected therewith, the Executive Commissioners have to report that, in response to their advertisements calling for applications for the position of editor, no less than forty-seven gentlemen replied, many of them being of well-known literary ability. The recommendation of the Printing Committee that Mr. Mathew Macfie receive the

appointment was, after careful consideration, approved by the Executive.

The premises erected for the accommodation of the Exhibition Fire Brigade having been completed, the men have been located there; and the necessary electric fittings, alarm circuit, detector clock, etc., are being added as circumstances permit.

The whole of the fire apparatus is now in thorough working order, and the fire-plugs throughout the buildings have all been inspected and tested.

The site for the 16 horse-power Otto gas-engine and pump, to be used for maintaining a pressure in the water-pipes during hot weather, or in case of fire, has been determined upon. The work of erecting these is being carried out by Messrs. Robison Bros., the contractors for the plant, and the 9-inch pipe connecting the 24-inch main in Nicholson street with the Exhibition service has been laid by the Water Supply Department.

The 5-ton steam-crane, lent by Messrs. Appleby & Co., is being erected at the Nicholson street goods entrance, where the tramway lines have also been relaid with new sleepers.

With regard to electric lighting, the Executive have to announce that they have concluded satisfactory arrangements for this very important feature of the Exhibition with the Australian Electric Light Company for the sum of £32,144.

The question of the supply of the motive power is still receiving consideration, together with that of the necessary shafting, gearing, etc.

In connection with the musical performances, which are expected to form a special feature during the currency of the Exhibition, the Executive have pleasure in reporting that they have succeeded in securing the services, as conductor, of the eminent musician and composer, Mr. Frederick H. Cowen.

Mr. Cowen has latterly been chosen to succeed Sir Arthur Sullivan as conductor of the London Philharmonic Society, and this fact alone is sufficient to indicate his value in that respect.

The amount of floor-space available for allotment in the main hall and the new annexes has now been approximately allotted to the various countries applying through the Commissions appointed by their respective Governments, while space has also been reserved for exhibitors from countries not officially represented.

The allotment at present is as follows:

Main hall—floor space.

	Square feet.		Square feet.
Great Britain (including Lancashire)	11,520	India	1,420
France	8,890	New South Wales	600
Germany	6,010	Victoria	12,450
Austro-Hungary	1,180		46,030
United States of America	3,000	Still available (reserved)	7,750
Italy	960	Total	53,780

Temporary annexes (including extra bay of 50,250 square feet).

	Square feet.		Square feet.
Great Britain	111,817	Queensland	5,000
France	56,000	New Zealand	10,000
Germany	54,500	Canada	20,000
Austro-Hungary	15,000	Victoria	243,000
Belgium	3,500	Reserved for other courts	21,000
Switzerland	3,000		684,717
United States of America	37,500	Reserved under dome	8,000
New South Wales	80,900		
Tasmania	3,500	Total	692,717
South Australia	20,000		

The Agent-General has been informed of the above by cablegram, and plans on a large scale of the portion allotted to each of the different countries, together with a key plan, were forwarded to him by the last mail.

Similar plans are being forwarded to the Commissions of the Australasian Colonies; and the allotment of space to exhibitors in the various courts will, no doubt, be proceeded with at once.

The following meetings have been held by the various committees since January 28 last:

Executive (including five meetings of subcommittees)	10
Ceremonial (including nine meetings of subcommittees)	14
Finance	3
Wine	1
Refreshments	3
Building (including four meetings of subcommittees)	13
Printing	3
Fine Arts	2
Animal Products	1
Vegetable Products	1

Signed on behalf of the Executive Commissioners.

GEO. HIGINBOTHAM,
President.

MARCH 7, 1888.

EIGHTH REPORT.

The Executive Commissioners have again to report a steady advance being made in all branches of the work pertaining to the forthcoming Exhibition.

The external painting, and the internal painting and decorations, have now made such progress as to lead to the expectation that they will be completed by the contract time.

The additional bay at the northern end of temporary annexes, mention of which was made in the last report, has been commenced, and there is little doubt will also be ready in time. The height of the floor

above the natural level of the ground at this point has been taken advantage of to secure additional space underneath for the display of exhibits, equal to over 25,000 square feet.

The different committees continue actively engaged in forwarding the different portions of the work entrusted to them, and, since the general meeting at these offices on the 7th instant, have held the following meetings:

Executive (including five subcommittee meetings)	8
Ceremonial (including eight subcommittee meetings)	9
Finance	2
Building (including eight subcommittee meetings)	11
Printing	1
Fine Arts	1
Animal Products	1
Machinery (including two subcommittee meetings)	3
Minerals and Mining	2
Manufactures (including five subcommittee meetings for the allotment of space)	6

In the last report it was mentioned that a contract had been entered into with the Australian Electric Company for the erection and working of the necessary electric plant and fittings for lighting the buildings during the progress of the Exhibition.

Since then tenders have been accepted for the necesssary motive power, as under:

	£	s.	d.
Three pairs high-pressure horizontal engines	5,550	0	0
Twelve steel boilers	7,200	0	0
Shafting, gearing, etc	5,604	6	9

The following is a list of contracts entered into since last meeting, and list of the works now being tendered for:

Alteration to dining rooms, etc., erection of additional bay to annexes, inclosing space below floor level of temporary annexes.

Works for which tenders have been called—erection of engine and boiler houses, etc., cartage, temporary gas lighting.

In connection with the fire appliances, the 16 horse-power Otto gas-engine has been fixed in position, and it is anticipated that within a few days the pumps will be erected, and the necessary connections made with the mains to insure sufficient pressure for all requirements throughout the water-pipes with which the buildings are now reticulated. In cases of emergency, a pressure equal to 300 pounds to the square inch will be capable of being maintained.

The 5-ton steam-crane is now erected at the Nicholson street entrance, and is in thorough working order, and has already been in use in connection with the receipt of goods from the Adelaide Exhibition.

An arrangement has been entered into with Messrs. Waygood & Co., by which that firm have agreed to construct a lift from the ground floor to the dome parapet on most advantageous terms to the Exhibi-

tion Commissioners. The work in connection with this is now proceeding rapidly.

The exertions made by some of the sister colonies to be well represented at the Exhibition have been so successful as to make it necessary for them to apply for further space to that at first allotted to them.

The Executive Commissioners have, therefore, at the earnest request of the Commissioners appointed, increased the space allotted to South Australia from 20,000 square feet to 25,000 square feet; New Zealand, from 10,000 square feet to 20,000 square feet; and Tasmania from 3,500 square feet to 12,500 square feet. Judging from the latest information received, the very large increase of floor-space which has been provided in excess of that which was allotted in 1880–'81 will, it is feared, prove totally insufficient to meet the requirements of the different countries and colonies proposing to exhibit, if all the space applied for be granted.

In the machinery section applications have been received for 145,000 square feet of space, exclusive of the quantity which has been applied for by Victorian exhibitors, and which of itself will not be less than about 75,000 square feet. This amount of 220,000 square feet, large as it is, will be swelled by the requirements of the United States of America and Canada, from neither of which places has the necessary information on the subject been received.

It will be obvious, therefore, that very little short of a quarter of a million square feet of floor-space will be required for exhibits of machinery, and although some portions of this will no doubt admit of being placed in the open grounds, the greater portion must necessarily be placed in buildings, and on foundations of more or less stability, and this means a very considerable addition in the shape of annexes in addition to those already existing. An Armament Court, covering an area of about 20,000 square feet, will also require to be erected, in order that the large and representative collection of ancient and modern arms and weapons of war, which is being specially brought together for the purposes of exhibition, may be effectively displayed.

The latest advices to hand respecting the loan collection of pictures, allusion to which was made in the sixth report submitted to the Commissioners on the 28th of January last, state that the matter is progressing favorably.

It has been considered desirable that exhibits illustrative of the educational systems of the various countries and colonies should, if possible, be brought together in a special Court for the purpose of comparison. With this view, circulars have been issued to the various colonies, and through the Agent-General to the British and European Commissions, requesting them to give this matter very careful consideration, and, if possible, their co-operation.

It has been further suggested that experts in educational matters should visit Victoria for the purpose of comparing the different systems and interchanging ideas on the subject. The Commissioners for

New South Wales have already replied, stating that they consider the matter one of the greatest importance, and promising to use their best endeavors to insure a successful representation on their part.

Mr. R. S. Walpole having expressed a desire to act on the Ceremonial and Wine Committees, the Executive Commissioners recommend that his name be added to the committees accordingly.

An estimate has been carefully prepared, showing that in connection with the Exhibition the outlay up to the 31st of July next may be anticipated to amount to £217,000, as follows:

Temporary annexes, new offices, and reception roooms:	
Contracts let	£71,759
Estimated amount required in addition	16,000
Electric lighting:	
Contracts let	44,894
Estimated amount required in addition	13,000
Painting and decorations:	
Contracts let	11,707
Estimated amount required in addition	1,500
All other contracts	2,898
Estimated amount required in addition	2,000
Alterations carried out by day labor	5,161
Gas fittings and gas	4,000
Orchestra, chorus, etc	17,000
Catalogue, architect's commission, insurance of pictures	7,700
Expenses of London and other committees	6,350
Salaries, wages, stores, etc., including gardens, aquarium, fire brigade, etc	12,980
Total	216,949

Against this expenditure—to which must be added the wages, etc., during the currency of the Exhibition—there will be a set-off, consisting of the receipts from admissions and other sources, and the value of the electric-lighting plant, machinery, buildings, etc., at the close of the Exhibition. There is at present no reason to suppose that the net cost to the country will exceed to any great extent the sum originally named by the Commissioners on the 26th of January, 1887, in their interview with the Treasurer, viz, £100,000.

Signed on behalf of the Executive Commissioners.

GEO. HIGINBOTHAM,
President.

MARCH 27, 1888.

NINTH REPORT.

The Executive Commissioners have to report that the various works required for the completion of the necessary buildings, etc., are being pushed forward, and will admit of the Exhibition being opened, as originally contemplated, on the 1st of August next.

The additional bay at the northern end of the annexes is well advanced, and the internal decorations are keeping pace with the buildings.

In consequence of the large amount of additional space applied for it has been found necessary to extend the annexes on the western side to a line 12 feet from the Rathdown street boundary, and to the full depth of the annexes on that side. These additional buildings will cover a space of 600 by 78, or 46,800 superficial feet, and will be principally occupied by French and German exhibits. A contract has been entered into for the erection of this addition at a price of £7,434 19*s.* 1*d.*

The large amount of space required for the exhibition of machinery, both stationary and in motion, necessitates the erection of further buildings for its accommodation, and tenders have been accepted for additional annexes on the western side of, and parallel with, the permanent annexes. This, and one on the eastern side, north of the Nicholson street goods entrance, will give a further available space of 112,864 superficial feet, at a cost of £22,611 11*s.* 10*d.*

A contract has been accepted for the erection of an engine-house to contain the electric-lighting plant, and progress is being made with this work. The contract price is £7,397 12*s.* 3*d.* for the building, and for the shafting, etc., £3,996 6*s.* 9*d.* For the whole of this work the designs of Mr. T. H. Woodruff, engineer to the railway department, have been utilized, and, with the consent of the railway commissioners, that gentleman has undertaken the superintendence of its erection.

The contractors for the electric lighting of the buildings are pushing the work forward rapidly, the leads, consisting of many miles of wire, having already been placed in position.

The contractors for the engines and boilers required for driving the dynamos have the work well in hand, and there is every reason to expect that the lighting arrangements of the whole of the buildings will be completed by the specified time. Arrangements for partially lighting by gas, should the same be required at any time, will also shortly be completed.

It is expected that the new offices for the staff will be ready for occupation in a few days, and opportunity will be taken of remodeling the present offices to suit other requirements.

The accommodation which will be required for post and telegraph departments, including telephonic communication, as well as that for the customs and police, has not been overlooked, and the matter is receiving immediate attention.

Referring to the mention made in the fifth report of the contemplated

musical arrangements, the Exhibition Commissioners desire to state that these are now nearly completed. The director, Mr. F. H. Cowen, will arrive some time in June, and will bring with him about fifteen instrumentalists. The rest of the musicians composing the orchestra have been engaged locally.

The formation of the chorus is progressing, and it is expected that in a few days the full number required will be completed.

The acoustics of the main hall have been carefully studied, and several alterations are now being made to enable full justice to be done to the musical performances.

The arrangements for the comfort and convenience of the ladies and gentlemen composing the orchestra and chorus are in progress, and will be found thoroughly suitable for their intended purpose.

For the musical setting for the prize poem, twenty-eight compositions were received. These were submitted to the following gentlemen, who had consented to act as judges: The Rev. G. W. Torrance, Mus. Doc., Alberto Zelman, Roberto Hazon, and Alfred Plumpton.

The first award has been adjudged to the composition of Mr. H. J. King, of Sydney, and the second to that of M. Leon Caron, of the same city.

The Executive Commissioners have great pleasure in drawing attention to the very gratifying response which has been made to the request of the British Royal Commission by the possessors of pictures of a high class. The result has been the gathering together of a splendid collection of the works of eminent artists for exhibition here.

Contracts have been accepted for the catering and refreshment bars, and the Executive have pleasure in stating that the premiums paid for these privileges amounted to £5,450. There is every reason to believe that the successful tenderers may be fully relied on to carry out these very important arrangements satisfactorily.

It has been determined to fit up a small portion of the buildings with a suite of rooms for the use of His Excellency the Governor and the Commissioners, including those representing the various nationalities. These will be lighted with electric light.

The Executive have considered it desirable to appoint Mr. Thomas Pugh to the position of General Superintendent. This gentleman had control of the same department during the Exhibition of 1880–'81, and his experience in subsequent exhibitions has, in their opinion, specially qualified him to fill that position satisfactorily.

Acting on the recommendation of the Finance Committee, the Executive have determined that the method of admission to the buildings on all ordinary occasions shall be effected through registering turnstiles, at which the exact amount of cash will require to be tendered by the public. Boxes will be erected in suitable places, where change will be obtainable, in order that this system may be carried into effect.

It has also been determined, on the recommendation of the same committee, not to issue season tickets.

In connection with the loading and unloading of goods it has been deemed necessary, in consequence of the very large increase in the area of the Exhibition buildings, to receive goods at five different entrances, three on the Rathdown street side and two fronting Nicholson street. At these entrances cranes are being erected capable of dealing with weights up to 12 tons. It is expected with this accommodation that the work of distributing the exhibits, as they arrive, over the different portions of the buildings will be simplified and accomplished with ease and rapidity.

Contracts have been entered into for the cartage of goods from the various wharves and railways in Melbourne to any of the above entrances at 1*s.* 10½*d.* per ton, calculated either by measurement of 40 cubic feet, or by weight of 20 cwts.; and for the storage of empty cases and packages at the rate of 4*s.* 10*d.* per ton of 40 cubic feet, for a period extending to four weeks after the close of the Exhibition; after that at the rate of 1*d.* per ton per week.

The committee appointed to deal with the allotment of space to intending Victorian exhibitors has finished its labors so far as the granting of space is concerned. The work in connection with the determination of the position of each individual exhibitor is proceeding rapidly, and will soon be completed.

With a view to the prompt and efficient dispatch of business, the Executive Commissioners have found it expedient to appoint one of their number, with the title of Executive Vice-President, to act as their representative in all matters requiring to be dealt with without delay. The position has been offered to and accepted by the Hon. Lieut. Col. F. T. Sargood.

The total amount of floor-space granted to the various countries and colonies to the latest date is as follows, but further modifications will doubtless be necessary:

Country.	Fine arts.	Main building.*	Annexes.	Machinery.	In grounds.	Total.
Austro-Hungary	.....	1,180	13,970	.....	(†)	15,150
Belgium	3,500	.....	4,230	.....	.....	7,730
Canada	.....	.....	20,000	(†)	(†)	20,000
France	2,150	8,890	66,925	2,150	.....	80,115
Germany	6,000	6,010	74,595	20,000	5,000	111,605
Great Britain	(†)	10,770	111,817	108,000	.....	230,587
Italy	.....	960	3,750	.....	.....	4,710
New South Wales	950	870	83,300	15,500	3,000	103,620
New Zealand	.....	.....	20,125	2,000	2,400	24,525
South Australia	.....	.....	30,872	.....	.....	30,872
Switzerland	.....	.....	3,600	.....	.....	3,600
Tasmania	.....	.....	12,500	.....	.....	12,500
United States	(†)	3,000	37,500	(†)	.....	40,500
Victoria	(†)	12,450	217,539	31,178	19,000	280,167
Queensland	.....	.....	5,750	500	2,400	8,650

*Exclusive of cellar space. † No advices yet received as to requirements for these countries.

Since the last report the different committees have held meetings as under:

Executive (including six subcommittee meetings)	11
Building (including three subcommittees meetings)	10
Machinery	3
Finance	7
Ceremonial (including eleven subcommittee meetings)	14
Manufactures (including twenty-four subcommittee meetings)	25
Fine Arts (including one subcommittee meeting)	4
Vegetable Products (including four subcommittee meetings)	5
Refreshments	1
Minerals and Mining (including one subcommittee meeting)	2
Printing	1
Animal Products (including one subcommittee meeting)	3
Wine	1
Intercolonial	1

Signed on behalf of the Executive Commissioners.

JAS. MACBAIN,
Vice-President.

MAY, 1888.

TENTH REPORT.

The Executive in presenting their tenth report in accordance with the regulations, regret that it has been impossible, in consequence of the pressure of work, to call together the Commissioners at an earlier date.

The position of President, which at the time of the last meeting had been rendered vacant by the retirement of His Honor the Chief Justice, has since been conferred by the Government upon Sir James MacBain, who has, since his acceptance of office, conducted the work of the Exhibition in conjunction with the Executive.

After considerable discussion the Executive has deemed it advisable to adhere to the date originally fixed for the opening of the Exhibition, namely, the 1st of August. The opening ceremony will consequently take place on that day, and invitations to the leading political, religious, municipal, and civil-service officials of this and the other Australasian colonies, have been issued to the number of about six thousand, the remaining space having been thrown open to the public for purchase by ticket.

In consequence of the large amount of space required for exhibits, both in the machinery and industrial sections, it has been found necessary to further extend the area under cover. In addition to the bay added at the northern end, three machinery sheds, covering an area of about 50,000 square feet, are in various stages of completion. Additional annexes have also been erected to hold the exhibits for minor and

educational courts, covering 42,000 square feet; a machinery annex for British and foreign machinery, 96,000 square feet; machinery annexes for the Australian colonies, 30,000 square feet; an Armament Court, 17,500 square feet, and buildings containing the whole of the electric-lighting machinery, of an area of 31,250 square feet.

All the necessary rooms for the convenience of His Excellency the Governor and his guests, Commissioners' dining-room, etc., have been erected in the southern end of the permanent western machinery annex, and are now approaching completion.

The erection of the turnstiles for the admission of the public is being rapidly proceeded with, and these will be ready on the day of opening.

The total area covered by the buildings and available for the purpose of exhibiting goods is about 35½ acres.

The question of insuring this large and valuable property has occasioned the Executive Commissioners a considerable amount of anxiety, especially in view of the fact that the insurance companies have seen fit to considerably raise the premiums upon all insurance in connection with the Exhibition.

The following amounts have, however, been placed by the Commissioners' brokers:

Main building	£44,489
Annexes	55,540

Endeavors are being made to extend these amounts at a reasonable figure.

On the Victorian loan collection of pictures the rates asked were regarded as so excessive that a deputation from the Executive consulted the Premier on the subject, with the result that the Government resolved to incur the responsibility of becoming answerable for the safety of these pictures, rather than insure them at the premiums demanded.

The loan collection of pictures forwarded from England has arrived, and is being rapidly placed in position in the fine arts section allotted to Great Britain.

The art collections of other exhibiting nations are also well forward, and will no doubt be ready for inspection on the opening day.

The exhibits in the industrial section are being rapidly placed in position, but the enormous space to be covered, and the late period at which some of these will reach the colony, render it impossible for every exhibitor to have his goods fully prepared for inspection on the 1st proximo. There is little doubt, however, that a very good show will be made on that day, and that a short time subsequently will see the whole of the industrial exhibits erected and in order.

Machinery exhibits are still arriving from England, and it is therefore impossible that this very interesting portion of the Exhibition, consisting as it does of so many moving exhibits, can be fully completed for a short period after the opening of the Exhibition. It is not antici-

pated, however, that the Exhibition will be in a less complete state of preparation on the opening day than is usual with large international exhibitions throughout the world, where goods have to be brought in large quantities many thousands of miles.

The gold passes for the members of this Commission are being rapidly prepared and are in course of issue.

The decorations of the various Courts, including those facing the Grand Avenue of Nations, are rapidly approaching completion.

The Executive Commissioners desire to place on record their obligations to the railway commissioners for ready assistance at all times, which has greatly facilitated their labors, and for the large concessions made by the issue of free passes over the lines to visitors from other colonies, and by granting reduced suburban fares to the lady members of the choir.

The responsible and onerous position of Chairman of Juries has been accepted by Joseph Bosisto, esq., C. M. G., by whom rules and regulations have been drawn up and approved by the Executive. These, however, are considered a matter of such grave importance to the final success of the Exhibition, that before finally adopting them it has been deemed advisable that they should be distributed among the members of the Commission for perusal, and receive their approval before being put in force.

The balance-sheet up to the 30th of June last, duly certified by the Commissioners of Audit, will be found attached to this report.

For the Executive Commissioners.

JAS. MACBAIN,
President.

JULY 23, 1888.

Centennial International Exhibition, Melbourne, 1888—Balance-sheet, 30th June, 1888.

RECEIPTS.

	£	s.	d.	£	s.	d.
To treasury vote, 1886-'87	999	1	9			
To treasury vote, 1887-'88	100,000	0	0			
To treasury vote, 1888-'89, including remittance to London	49,792	2	3			
				150,791	4	0
To aquarium receipts				3,466	18	0
To licenses and rents				1,519	13	8
To catalogue				449	15	0
To deposits on contracts				1,819	12	0
To sale of old materials				0	11	0
To debit balance Federal Bank				759	12	0
				158,807	5	8

EXPENDITURES.

	£	s.	d.	£	s.	d.
By temporary annexes	85,346	9	11			
By decorations	10,369	4	0			
By electric-light expenses	23,960	9	3			
By machinery in motion	735	14	3			
By new offices, reception rooms, etc	2,414	18	0			
By fencing, etc	693	19	0			
By aquarium building expenses	413	6	0			
By gas and gas fittings	868	7	11			
				124,802	8	4
By advertising				311	7	11
By aquarium working expenses				3,093	6	1
By agent-general expenditure	1,377	7	11			
By agent-general expenditure, remittance to London, June 25, 1888	10,00	0	0			
				11,377	7	11
By closets and lavatories				28	15	6
By committees' expenditures				268	18	7
By furniture				135	9	6
By fire brigade				1,496	10	4
By general wages				3,437	11	8
By gardens				1,842	11	5
By general charges				506	3	6
By insurance				240	19	3
By interest				1	16	4
By orchestra and chorus				1,072	0	8
By office expenses				4,890	17	1
By ceremonial expenses				163	18	3
By printing and stationery				1,094	14	10
By refreshments				36	19	6
By stores				1,196	9	7
By sundry charges on exhibits				4	4	3
By telegrams				570	18	8
By secretary's emergency account	400	0	0			
By deposits lodged to credit of secretary's account	1,819	12	0			
				2,219	12	0
By balance City of Melbourne Bank				14	4	4
				158,807	5	8

JULY 4, 1888.

GEO. T. A. LAVATER,
Secretary.
W. G. TULLOCH,
Accountant.

Examined and found correct.

W. H. TUCKETT,
Auditor.

We certify that the books and accounts of the Centennial International Exhibition, Melbourne, for the year ending June 30, 1888, have been examined and found correct.

T. W. JACKSON,
JOHN W. FOSBERY,
Commissioners of Audit.

AUDIT OFFICE, *Melbourne, July* 16, 1888.

ELEVENTH REPORT.

When presenting their last report, the Executive Commissioners stated that it had been deemed advisable to adhere to the date originally fixed for the opening of the Exhibition, viz, the 1st of August.

As the Commissioners are aware, that determin ation was duly carried out, and on that day the Centennial International Exhibition of 1888 was formally opened by His Excellency the Governor of Victoria, in the presence of the whole of the Governors of the Australasian colonies, with the exception of Western Australia, and a large and representative assemblage of over eight thousand people.

The Executive have great pleasure in stating that the whole of the ceremonies connected with the opening of the Exhibition, from the inaugural outside procession to the closing internal ceremonies, were carried out in the most successful manner, and that the arrangements were favorbly commented upon by both the press and the public. The Commissioners have further pleasure in stating that they have been congratulated by the different Governors and the leading personages of the various colonies upon the manner in which all the arrangements in connection with the opening ceremony were planned and carried out.

The series of banquets, concerts, etc., which marked the fortnight subsequent to the opening of the Exhibition were very successfully carried out, and, as numbers of letters on the subject which have been received prove, were excessively gratifying to the visitors from the various countries and colonies who were entertained at them.

The Executive Commissioners desire at this point to place on record their appreciation of the manner in which the various officers of their staff, and all employés connected with the Exhibition, performed the duties intrusted to them on that occasion.

The number of persons who visited the building on the opening day was 35,107, as against 24,100 who visited the Exhibi tion of 1880 on the like occasion.

The attendance throughout the whole of the month of August has shown a very marked improvement upon that which obtained during the month of October, 1880, in spite of the fact that the weather has not been so favorable for securing a large attendance. The records show that during the past month 312,272 persons have visited the Exhibition, as against 189,428 in October, 1880, or an increase of nearly 65 per cent. on the attendance during the first month of the last Exhibition.

Since the opening, a very large amount of work has been done in the shape of completing exhibits in the industrial sections, but more yet remains before this portion of the Exhibition is finally completed, and the Internal Arrangements Committee have been taking steps to push this portion of the work to completion.

In the machinery section, delay has been unavoidable, as, at the date of opening, the erection of a considerable portion of the buildings for

this part of the Exhibition was still in progress. A large amount of work has, however, been done, and it is hoped that within a short time this section of the Exhibition will be completed.

The erection of the Armament Court has been finished, and good progress is now being made in the matter of placing exhibits in position.

Some educational exhibits (notably those of Great Britain) have not yet arrived in the colony, but advice has been received of their shipment, and preparations are being made to deal with them as soon as they come to hand.

The first edition of the Catalogue, which has been issued, was necessarily incomplete, the late arrival of a very large number of the exhibits in several of the Courts rendering it impossible to obtain sufficient data to insure accuracy. The difficulty of obtaining complete information as to the exhibits in some of the Courts has led to delay in the preparation of the second edition; but it is anticipated that this will be ready almost immediately, and that the inaccuracies and omissions which marked the first edition will be found to have been remedied in this.

A special Fine Arts Catalogue has been prepared, dealing entirely with that section of the exhibits, and giving, wherever practicable, information regarding the different paintings in the Fine Art Galleries. This will form a very interesting record of what, taken on the whole, is, without doubt, the finest collection of paintings which has yet been exhibited in Australasia.

The method of admission by means of registering turnstiles and the accompanying cash payment, instead of by tickets as heretofore, has now had a fair trial, and has been found to work satisfactorily, and it is anticipated that it will be even more so now that the men have mastered the manipulation of the turnstiles.

Referring to the lighting of the building by means of the electric light, the Executive has great pleasure in stating that, after a month's trial of what is stated to be the largest single installation in the history of electric lighting ever attempted by a single company, it has proved a marked success.

The arrangements for catering, and those generally for the convenience of the public, have been carefully supervised, and improvements effected from time to time as experience dictated.

The musical performances given under the direction of Mr. F. H. Cowen, from the inaugural ceremony to the present time, have been the theme of universal approbation, and as an educational feature in the art and practice of music will doubtless be found of great value in the future.

It having come to the knowledge of the Committee for Internal Arrangements that some of the exhibitors are in the habit of selling and delivering goods not manufactured in and during the progress of the Exhibition, and without the authority of a special permit, as required by the ninth clause of the regulations promulgated in the official prospectus, under which all applications for space were made, the Executive are

taking measures which they trust will enable them to put a stop to this very objectionable practice.

The question of expenses in connection with carrying on the work of the Exhibition during the time it is open has been carefully considered and the staff list is being constantly revised with a view to keeping the expenditure down to the lowest point consistent with efficiency.

In connection with the work of the committees the following shows the number of meetings which have been held since the presentation of the tenth report:

Executive	7
Internal Arrangements	7
Finance	8
Building (including 1 sub)	9
Animal Products (including 2 subs)	6
Printing	2
Ceremonial (including 2 subs)	3
Minerals and Mining (including 1 sub)	3
Machinery (sub)	1
Vegetable Products	1
Wine	1
Invitations	1

The Commissioners have arranged for the following special shows to be held: Dairy produce, 20th, 21st, and 22d, September; grain and other agricultural produce, 9th and 10th October; dairy produce (second show), 1st, 2d, and 3d November; horticultural, 15th and 16th November; wool, January, 1889; horticultural (second show), January, 1889 (date not fixed).

The following balance-sheet shows the receipts and expenditure in connection with the Exhibition to the 31st August, duly certified by the auditor:

Centennial International Exhibition, Melbourne, 1888.—*Balance-sheet, August* 31, 1888.

RECEIPTS.

	£	s.	d.	£	s.	d.
To treasury vote, 1886-'87	999	1	9			
To treasury vote, 1887-'88	99,999	19	8			
To treasury vote, 1888-'89	98,742	4	2			
To treasury advance	39,516	15	6			
				239,258	1	1
To admissions	13,977	12	3			
To aquarium receipts	3,805	5	0			
To auction sales	1	11	0			
To catalogues	354	13	8			
To closets and lavatories	83	11	6			
To Commissioners' wine bars	161	4	0			
To concerts	901	8	8			
To deposits on contracts	1,107	2	0			
To dome receipts	59	0	2			
To licenses and rents	4,111	15	4			
To prize fund, Burgoyne	52	10	0			
				24,615	13	7
				263,873	14	8

EXPENDITURES.

	£ s. d.	£ s. d.
By temporary annexes	112,510 13 7	
By electric-light expenses	53,191 4 7	
By decorations	13,811 2 6	
By new offices and reception rooms	2,950 9 7	
By machinery in motion	4,180 19 6	
By fencing	715 19 0	
By aquarium building expenses	413 6 0	
		187,773 15 0
By agent-general		1,885 3 2
By agent-general, remittances	10,000 0 0	
Less vouchers received and debited to agent-general	507 5 3	
		9,492 14 9
By advertising		450 12 5
By aquarium working expenses		3,550 12 9
By ceremonial expenses		2,702 19 10
By closets and lavatories		256 14 8
By committees' expenditure		268 18 7
By Commissioners' wine bars		96 17 0
By furniture		1,670 5 6
By flag department		345 3 9
By fire brigades		2,371 3 6
By gardens		2,919 12 2
By gas and gas fittings		1,728 14 8
By general charges		3,124 18 0
By general wages		12,691 17 2
By insurances		2,122 4 5
By interest		1 16 6
By office expenses		7,315 1 5
By orchestra and chorus		6,735 10 4
By orchestra alterations		1,076 10 3
By printing and stationery		1,348 10 3
By refreshments		79 0 11
By secretary's advances account		2,271 12 3
By stores		3,023 4 9
By sundry charges on exhibits		47 2 10
By telegrams		609 14 11
By working dairy		46 14 3
By switchback railway		294 0 0
Bank balances—		
Federal Bank	5,497 0 1	
City Bank	1,633 12 6	
		7,130 12 7
By cash in hand, 31st—receipts		442 6 1
		263,873 14 8

GEO. T. A. LAVATER,
Secretary.

W. G. TULLOCH,
Accountant.

SEPTEMBER 5, 1888.
Examined and found corrrect.

W. H. TUCKETT,
Auditor.

September 7, 1888.
For the Executive Commissioners.

JAS. MACBAIN,
President.

SEPTEMBER 10, 1888.

TWELFTH REPORT.

Since the presentation of the last report nothing of sufficient importance has transpired to necessitate calling the general body of Commissioners together to receive a further report.

At the last (special) meeting a copy of the regulation for the purpose of dealing with unauthorized sales within the Exhibition, and which had been specially drafted by the solicitors, Messrs. Malleson, England & Stewart, was adopted. This new regulation was duly approved by the Governor in Council, and gazetted on the 16th October, 1888. Previous to its being enforced, several endeavors were made to stop unauthorized sales by warning exhibitors to discontinue disposing of their goods. In many instances the exhibitors disregarded these warnings, and it was deemed advisable by the Executive to institute proceedings against those selling in contravention of the regulations, and the Commissioners' solicitors were instructed accordingly to proceed against them.

The validity of the regulations passed by the Commissioners having been questioned, the cases were postponed to admit of the matter being dealt with by the Supreme Court, and the points at issue were argued before the full court on the 30th of November. The judges were unanimous in their decision, which was to the effect that the regulations passed by the Commissioners were valid, and possessed the full force of law.

On the 6th of December the cases were heard at the Melbourne police court, and the offending persons were fined in small amounts with costs, the Commissioners having instructed the solicitors not to press for heavy penalties. It will be seen, therefore, that the Executive Commissioners have carried out the wishes expressed by the general body at previous meetings, viz, that the sale of goods not manufactured in and during the progress of the Exhibition was undesirable and should not be permitted.

The Exhibition has now been open over four months, during which time it has been visited by 1,395,884 persons, of whom 1,203,921 have paid for admission. The total amount received to this date is £73,400 6*s*. 3*d*.

The desirability of keeping the Exhibition open for a longer period than was originally intended has engaged the attention of the Executive. Communications were addressed to all the Commissioners of the various Courts, with a view of ascertaining if the extension were practicable. The general tenor of the answers received showed that there was every desire on the part of the Commissioners of the various countries and colonies exhibiting, to meet the wishes of the Executive Commissioners, if they proposed to extend the date for closing. The difficulties, however, were such that, after mature deliberation, it was decided to adhere to the date originally fixed, viz, the 31st of January, 1889.

The second edition of the Catalogue was issued on the 10th of September, 1888. In this were rectified the errors of the first edition, so far as was possible with the information to hand. The late date, however, of the reception of many of the exhibits rendered it impossible for the second edition to contain everything that is now being displayed in the buildings and grounds, and particulars are now being obtained with a view to complete the Catalogue by an addendum.

Having regard to the onerous and difficult task of judging of the relative merits of the exhibits under the different classes, the Executive Commissioners, after careful consideration, requested Mr. Bosisto, one of their number, to undertake the position of Chairman of Juries, a position which, from his great experience in exhibition work in all its branches, they deemed him specially suited to fill. The post having been accepted by Mr. Bosisto, the important work in this direction was at once proceeded with. The voluntary services of six hundred and thirty-five gentlemen and nineteen ladies, qualified to act as judges, having been obtained, judging was commenced on the 12th of September, and has been continued without intermission. In all, fifty-four juries have been appointed to deal with the ninety-two classes of exhibits contained in the Exhibition. The following statement will show what has been completed in this respect to date of the present report:

LIST SHOWING CLASSES ADJUDICATED UPON, AWARDS MADE UP TO DATE, AND CONFIRMED BY EXECUTIVE.

Classes examined.

12. Photographs.
17, 18, and 20. Furniture and accessories.
19. Carpets.
57. Wool (1887 clip).
71. Carriages, etc.
80. Beers (bulk and bottled).
80. Malt and hops.

Awards made.

First awards	184
Second awards	157
Third awards	121
Fourth awards, honorable mention	68
	530

Awards made at special shows.

Description.	First.	Second.	Third.	Fourth.
Special grain show	30	26	19	6
Special farm and dairy shows	39	33	21	10
Horticultural show	38	19	9	0
Totals at special shows	107	78	49	16

Special shows, grand total	250
General exhibits, grand total	530
Total awards made	780

The Executive Commissioners trust that the judging will have been completed, and the awards made by the different juries confirmed by the Executive, in time for the lists of the same to be handed to the authorized representatives of each Court on the occasion of the closing ceremony.

In connection with the work of the committees, subjoined is the number of meetings which have been held (from 11th of September to 17th of December, 1888) since the presentation of the eleventh report:

Ceremonial (including subs)	11
Printing	6
Machinery	3
Finance	15
Internal Arrangements	20
Executive	14
Building (including subs)	19
Animal Products	4
Fine Arts	7
Wine	1
Mining	1
Chairmen	2
Vegetable Products	1

Attached will be found a statement of receipts and expenditures to the 30th November, 1888.

JAS. MACBAIN,
President.

DECEMBER 26, 1888.

Centennial International Exhibition, Melbourne, 1888—*Balance-sheet, November* 30, 1888.

RECEIPTS.

	£	s.	d.	£	s.	d.
To treasury vote, 1886-'87	999	1	9			
To treasury vote, 1887-'88	99,999	19	8			
To treasury vote, 1888-'89	99,994	17	0			
To treasurer's advances account	67,272	8	6			
				268,266	6	11
To admissions	50,062	13	6			
To aquarium	5,447	19	0			
To auction sales	1	11	0			
To catalogues	564	5	0			
To closets and lavatories	567	1	7			
To Commissioners' wine bars	817	19	3			
To concerts	5,219	17	5			
To dome	802	0	4			
To licenses and rents	5,717	18	3			
To shooting gallery	22	1	5			
To switchback railway	999	15	3			
				70,223	2	0
To deposits on contracts	810	0	0			
To prize fund, Burgoyne	52	10	0			
				862	10	0
				339,351	18	11

EXPENDITURES.	£	s.	d.	£	s.	d.
By temporary annexes	121,784	19	9			
By electric light	66,446	0	8			
By decorations	16,755	13	4			
By machinery in motion	11,023	0	10			
By new offices and reception rooms	3,107	12	2			
By fencing	754	6	9			
By aquarium building	413	6	0			
				220,284	19	6
By agent-general				1,962	19	9
By agent-general remittances	10,000	0	0			
Less vouchers received, debited agent-general	9,466	10	0			
				533	10	0
By advertising				921	18	6
By aquarium working				4,450	13	5
By ceremonial expenses				3,528	10	6
By closets and lavatories				1,269	5	5
By committees' expenditure				268	18	7
By Commissioners' wine bars				310	5	0
By electric railway				0	12	6
By fees to experts				42	5	0
By fire brigade				3,825	11	10
By flag department				3,097	12	1
By furniture				3,752	3	2
By gardens				4,136	12	5
By gas and gas fittings				5,608	2	4
By general charges				6,630	12	10
By general wages				19,287	17	11
By insurances				7,724	4	11
By interest				1	16	6
By office expenses				9,765	12	5
By orchestra and chorus				19,714	5	6
By orchestra alterations, etc				2,592	5	5
By other music				621	3	0
By printing and stationery				2,385	16	0
By refreshments	271	10	7			
By refreshments, jurors	208	18	5			
				480	9	0
By juries' department				20	2	1
By stores				5,054	12	1
By sundry charges on exhibits				55	18	11
By switchback railway				294	0	0
By telegrams				1,307	19	1
By working dairy				825	15	9
By auditors' fees				25	0	0
By secretary's emergency account				1,500	0	0
Bank balances:						
By Federal Bank	3,624	3	8			
By City Bank	3,182	11	6			
By cash in hand, receipts—30th instant	263	12	4			
				7,070	7	6
				339,351	18	11

G. T. A. LAVATER,
Secretary.

W. G. TULLOCH,
Accountant.

C. H. TUCKETT,
Acting Auditor.

Audited and found correct.
DECEMBER 6, 1888.

C.

ACCOUNTANT'S STATEMENT OF RECEIPTS AND ATTENDANCE.

W. G. Tulloch, Esq., the Accountant, submitted his report to the Victorian Executive Commissioners after the Exhibition had, on March 11, been closed to the public, and referring to the receipts and admissions the following statements appear in his report, viz:

The total number of admissions of visitors was 1,963,436, the daily average being 12,271. The largest attendance was on the 26th of January, the celebration of the founding of the colony of New South Wales, when the number registered was 42,395. The admissions, including workmen's and exhibitors' passes, totaled 2,226,295. The receipts for admission to the building from the 1st of August, 1888, to the 2d of February, 1889, amounted to £84,063 16*s.* 5*d.*, being a daily average of £525 7*s.* 4*d.* After the Exhibition had been formally closed on the 31st of January the admissions numbered 40,157, the receipts being £1,342 9*s.* 5*d.*

The total number of admissions to the aquarium was 161,787, and the receipts £3,770 4*s.*; to the dome, 126,978, £1,582 2*s.*

The switchback railway admitted 338,892 through the turnstiles, and the Commissioners, receiving 42½ per cent. of the takings, netted £1,784 6*s.* 8*d.*; whilst on the electric railways the passengers numbered 16,928.

The total attendance at the Cowen concerts was 467,299, the daily average 3,074, and the total receipts were £9,020 14*s.* 5*d.* At the other concerts—distinguished from the Cowen concerts and the free concerts given in the different Courts—the total attendance was 122,936.

D.

ADDRESS OF WELCOME BY THE MAYOR OF CASTLEMAINE.

To the United States Commissioners of the Centennial Exhibition, Victoria:

GENTLEMEN: As Mayor of the Borough of Castlemaine, I desire to convey to you the Council's most hearty welcome as Representatives of America to this borough and trust that you will receive gratification by your visit, and that the colony may reap advantage from your connection with our Exhibition. We believe that these expositions are highly beneficial to commerce and tend to the best feelings of friendship between nations. Trusting that the amicable relations between America and these Colonies may long continue, on behalf of this Borough and its citizens I again tender you our warmest welcome.

[SEAL.] AUGUSTUS COURTS YANDELL,
Mayor.

DECEMBER 17, 1888.

E.

SPEECH OF COMMISSIONER M'COPPIN AT CASTLEMAINE, VICTORIA, DECEMBER 17, 1888, ON THE OCCASION OF A BANQUET GIVEN TO THE UNITED STATES COMMISSIONERS BY THE MAYOR AND COUNCIL OF CASTLEMAINE.

That I feel more at home here to-day than I have hitherto felt in this colony is due to the cordiality of your reception of us, and perhaps somewhat to the circumstance that the name of your place has revived memories and feelings which have lain dormant for a very long time. It so happens that I was born within a few miles of the old original Castlemaine in Ireland, and I have heard there was a lady there of that name. But unlike most of her country people she was loyal to the British connection. 'Tis said she loved the King, and because she did her husband was made a Lord. But this place was founded upon better principles and better morals, and I know it is better governed and the people are happier here than in the other place.

I understand you select your public men upon a principle approved by the great Napoleon. When Madame De Stael asked him whom he thought the greatest woman in France, he answered, "She who has the most children." Well, seeing that the mayor of this town has had twenty-five children, as I am informed, he is, according to Napoleon, the greatest man in the colony, and had he lived under the first empire would doubtless have wielded one of the batons of France.

But it is of America you wish me to speak. That country has done much to ameliorate the conditions that surround us, to make life easier, and man's lot more contented. Long after the "Song of the Shirt" was written, Brother Jonathan discovered that the eye was in the wrong end of the needle, and thus destroyed, not the rhythm, but the pathos of Hood's beautiful song. The fact of Franklin's bringing down the lightning from the clouds through the instrumentality of the kite is embalmed in the works of one of the greatest of English poets and most liberal of Englishmen, Lord Byron. And the phonograph is an instrument, as you all know, of American invention, in which the human voice can be stored for ages—yes, for thousands of years. Just think of it—you who are now listening to me can, if you choose, speak in your own voice to your descendants five thousand years from now. The phonograph may possibly be used in the remote future for the purpose of determining which was the oldest family in point of rank, dignity, and education. The voice is a very fair index of the mind, as the use of language serves to show the degree of culture it has received,

and therefore the belles and beaux of the distant future will likely be bringing out the family phonograph to settle controversies touching these matters. It is announced that the illustrious British statesman, Mr. Gladstone, is soon to send a message through the phonograph to the American people. When he does it will resound throughout the world.

Coming, for a moment, to the immediate present, I promise you if you will go down to the American Machinery Court you will see some interesting things. There are two particularly ingenious pieces of mechanism to be seen there—one, a round auger that bores a square hole; the other one makes mosquito netting out of plates of cold steel, provided the mosquitoes in Australia are as large as your historian Froude represents them.

But when we come to think of the long night of agony through which the human family had to pass before the dawn came; of the scourgings, the rackings, the crucifixions to which man was subjected by cruel and bloody-minded tyrants, I undertake to say, without intending in the least to derogate from any other country or people—on the contrary, remembering that such men as Hampden lived, and that Charles Stuart and Louis XVI perished upon the scaffold—that the most august figure that ever appeared upon the human stage from the beginning of time until this moment was Brother Jónathan, in Philadelphia in 1776, when he proclaimed to the whole world that all men were created equal and had certain inalienable rights, such as life, liberty, and the pursuit of happiness. To maintain this principle he fought two wars with the mother country. But there was still an unfortunate blot upon the flag of our great country. Happily it has been removed, but at the cost of one of the most stupendous civil wars recorded in history; and now we are an absolutely free and happy people. The United States were weak, now they are strong; they were poor, but now they are rich beyond any other country. But though they are strong they do not seek to oppress the weak. The mission of Brother Jonathan is rather to stoop to the unfortunate, and uplift the poor and lowly. Though rich he does not maintain great standing armies with which to kill and destroy his weaker neighbors, nor has he covered the seas with those monstrous engines of destruction which are meant to batter down the houses of innocent people, and to sweep from the face of the waters those peaceful messengers which carry the commerce of the world from country to country.

The people of the United States see in these colonies one branch, and a most interesting branch, of the family to which they themselves belong, and they see that you are dealing with the same elements that they had to deal with—the aborigines, the wilderness, and the mine—and they recognize the fact that you are building up a great nation in this southern hemisphere, as they have done in the northern; and in all your aspirations after higher and nobler things be assured you have and shall have the full and cordial sympathy of Brother Jonathan.

F.

SPEECH OF SIR JAMES MACBAIN, PRESIDENT OF THE EXHIBITION, IN THE EXHIBITION BUILDING, JANUARY 15, 1889, *ON THE OCCASION OF A BANQUET GIVEN BY HIM TO DISTINGUISHED VISITORS.*

I wish all present a Happy New Year. I see around the tables a large number of gentlemen who have been actively engaged in contributing to the success of the Exhibition. Your work will soon be done and many of you will return to your own countries. It has afforded the Commissioners and the people of Victoria great pleasure to meet you here, and your departure will be a matter of regret. One of my duties this day will be to "speed a parting guest." Some people object to the word "guest" because there is a certain harshness in the term; but taking it in connection with another saying familiar to Englishmen, "The best of friends must part," that objection is removed. Hon. Frank McCoppin, the Executive Commissioner for the United States, will leave the colony on Monday next. You will all join with me in offering to Mr. McCoppin our best wishes. If Mr. McCoppin should ever become dissatisfied with his own country we hope he will come back to Victoria, where he will find the freest and most liberal system of government. I received a very flattering letter from Mr. McCoppin, notifying me of his departure and thanking the Commissioners and myself for the kindness he has received.

Sir James MacBain then read the letter, which appears in the Commissioners' Report, chapter 1, page 20.

G.

SPEECH OF COMMISSIONER M'COPPIN IN THE EXHIBITION BUILDING, JANUARY 15, 1889, ON THE OCCASION OF A BANQUET GIVEN BY THE PRESIDENT OF THE EXHIBITION, AND IN REPLY TO A SPEECH MADE BY HIM

It is most agreeable to my feelings to be dismissed by the President of the Exhibition Commission in so handsome a manner. When I was taking leave of the President of the United States, on my way to Melbourne, I said to him, "I promise you, Mr. President, that the administration of the affairs of the United States at the Melbourne Exhibition shall be respectable." The letter that Sir James MacBain has read shows that, in his opinion at any rate, I have fulfilled that promise. I received that letter under something like a false pretense. When a man says "adieu," the presumption is that he is going away; but here I am still, like one of those old actors who, having made his last appearance, is brought out again for a benefit. When my letter to the Commissioners was written I thought I should be going towards Torres Straits by this time, but the premature departure of the steamer has left me stranded here for the present.

I have a very high respect for the press of Melbourne. I have written to America, and it has been published, that the press of Australia is conducted with great ability and respectability, and is not, like a part of the press of the United States, a terror to families who do not like notoriety, and to whom the kind of gibbeting in which they indulge is a torture. I observe that the press of Melbourne show a disposition to criticise rather sharply the Exhibition and its management, and to draw inferences somewhat unfavorable to the latter. This is not just. The measure of success is comparative, and if they will look at what has been done elsewhere, they will find that the Melbourne Exhibition has been more liberally patronized by the people than any preceding exhibition in the world. The exhibition held in London in 1851 was visited by 6,000,000 people; that at Dublin, in 1853, by 1,000,000; that at Paris, in 1855, by 4,500,000; that at London, in 1862, by 6,000,000; that at Philadelphia, in 1876, by 10,000,000; and that at Melbourne in 1888 (during five months), by 1,500,000. From this it appears that of the people of England about one in six visited the exhibition of 1862, of

the people of France, one in eight visited the exhibition of 1855; of the people of Ireland, one in five visited the exhibition of 1853; of the people of the United States, one in five visited the exhibition of 1876, and of the people of Australia one in two visited the exhibition of 1888, equal to one time and a half for each inhabitant of Victoria. But, like every good thing one takes, including champagne, there might be a little headache in it. But after Victoria has made good the deficit, whatever it might be, she will find herself stronger and more self-reliant, and therefore richer than ever she was before. Communities, like individuals, are not aware of their own strength until they make a trial. Victoria has tried, and developed the strength of a giant. That England is throwing her money-bags at Victoria at 3½ per cent. is evidence of the truth of what I say.

The colony is to be congratulated upon having its affairs in charge of very able public men. The gentleman at the top, though representing imperialism, is in manners and that "*je ne sais quoi*" which makes public men popular as democratic as the best of our public men in America; and with regard to the lady, had that "divinity which shapes our ends" cast her destiny in the "White House," instead of the "Government House," she would be just as popular there as she deservedly is here.

I hope to live to see the commerce between the Colonies and the United States expand enormously, and as it grows, so also will grow and expand those kindly fraternal feelings which are as yet but faintly expressed, but which in time will embrace all the people of the two countries. Then the great silent Pacific Ocean will be dotted with those "white-winged messengers of peace" which carry the productions of nature and of man from country to country. Right in the track of this commerce lie certain groups of islands which possess much interest for both America and Australia. America is now striving to preserve the autonomy of these islands, but Australia is "silent still and silent all." It will be deplorable if, in the give-and-take game now being played by the statesmen of Europe, the independence of these most interesting islands should be sacrificed.

It has been said that a man who caused two blades of grass to grow where only one grew before was a benefactor; and the man who, by his conduct toward others, multiplies generous s ntiments and generous emotions in the minds of men is also a benefactor—and this Sir James MacBain has done.

H.

LETTER FROM COMMISSIONER M'COPPIN TO THE SECRETARY OF THE NAVY IN REGARD TO LIEUTENANT MARIX.

SAN FRANCISCO, CAL., *May* 29, 1889.

SIR: I have the honor to inform you that Lieut. A. Marix, U. S. Navy, was, at my request and by order of the Secretary of the Navy, assigned to duty as Secretary and Disbursing Officer to the Commission sent by the Government to the Melbourne Exhibition, in which capacity he has been associated with me for more than a year past.

Mr. Marix also acted as Superintendent of the American Court in the Exhibition, and was therefore brought into constant personal relations with all those citizens of the United States who had business with the Commission, as well as with the Colonial Officials, and I having, by permission of the Secretary of State, left Melbourne before the final closing of the Exhibition, Lieutenant Marix was appointed to represent the United States during my absence.

It affords me sincere pleasure to say that in the discharge of the various and delicate duties which were thus devolved upon him, Mr. Marix conducted himself with marked ability, good judgment, and tact, and therefore is entitled to a full share of whatever honor and credit attach to the success of the Commission.

I have the honor to be, sir, your obedient servant,

FRANK MCCOPPIN,
U. S. Commissioner.

Hon. B. F. TRACY,
Secretary of the Navy, Washington.

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